GOVDOC
BRA
115

BOSTON
PUBLIC
LIBRARY

GOV DOC
BRA
115

[illegible] 96-470

Property of
BOSTON REDEVELOPMENT AUTHORITY
Library

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

ASSESSMENT OF TRANSPORTATION IMPACTS
ASSOCIATED WITH
COLUMBIA POINT DEVELOPMENT PLANS

BOSTON
PUBLIC
LIBRARY

Kevin H. White, Mayor
City of Boston

Robert J. Ryan, Director
Boston Redevelopment Authority

Alfred R. Howard, P.E.
Transportation Planning Director

Boston Redevelopment Authority
Board of Directors
Robert L. Farrell, Chairman
Joseph J. Walsh, Vice-Chairman
James K. Flaherty, Treasurer
Clarence Jones, Member
William A. McDermott, Jr., Member
Kane Simonian, Secretary

prepared by the

Boston Redevelopment Authority

January 1983

Columbia Pt.
B65R

SUMMARY

This report assesses the transportation impacts of the development of the 292,000-square foot Bayside Exposition Center and Garment Showrooms and 1600 units of mixed income housing at Columbia Point in Dorchester. The analysis calculates existing and future traffic Levels of Service, as the chief indicator of the relative quality of traffic operations and points of congestion, at key points in the roadway system. The relationship of other modes of transportation is also discussed.

It is concluded that the impact of the new development is chiefly discernable in its immediate environs, as the amount of traffic generated represents only a small percentage of the general traffic on arterial roadways in the area. The net increase in vehicular trips to or from of under 8,000 per typical weekday represents about 8 percent of total traffic crossing a cordon line drawn around the development area.

Proposed roadway improvements consist of a realigned Mt. Vernon Street Connector from Day Boulevard and the connection of Mt. Vernon Street into the U-Mass./JFK Library roadway system. Analysis of future traffic indicated that the intersection of the Connector and Day Boulevard would operate at a Level of Service "F" in the morning peak hours, but that an adjustment in geometry could overcome this.

Improvements in public transportation, especially the linking of the Braintree branch trains of the Red Line to Columbia Station as well as the institution of boat service are desirable to reduce the dependence on the use of the automobile and to mitigate the occurence and extent of congestion. Improvements to the U-Mass shuttle bus system and the institution of such service to the proposed new development would significantly encourage the use of transit.

Numerical results from roadway capacity analyses performed as part of this study have been used as input for air quality analyses and are set forth in a separate report.

TABLE OF CONTENTS

Page

SUMMARY 1

LIST OF FIGURES 3

LIST OF TABLES 4

I. INTRODUCTION 6
- Purpose of Report 6
- Setting 6
- Development Program 9
- Initial Experience with the Bayside Exposition Center 9

II. EXISTING CONDITIONS 12
- Street and Highway Network 12
- Public Transportation 14
- Parking 16
- Pedestrian Circulation 16
- Water Transportation 16

III. PROPOSED TRANSPORTATION IMPROVEMENTS 22
- Roadway Changes 22
- Future Public Transportation 24
- Future Parking Supply 25
- Pedestrian Connections 25
- Boat Usage and Service 25
- No-build Alternative 25

IV. ESTIMATE OF FUTURE TRAFFIC 26
- Method 26
- Person Trip Generation 26
- Peak/Off-peak Period Distribution 28
- Modal Split 30
- Trip Distribution to Approach Corridors 30
- Trip Assignment to the Transportation System - Persons and Vehicles 30
- Truck and Taxi Traffic 33
- Parking Demand 33
- Traffic Volumes on the Roadway Network 34

V. ASSESSMENT OF TRANSPORTATION IMPACTS AND MEASURES TO MINIMIZE NEGATIVE EFFECTS 47
- Roadway Network Congestion 47
- Effects of other Transportation Elements - Transit, Boats, Parking 50
- Congestion Mitigation Measures 50

LIST OF FIGURES

Figure		Page
1.	Neighborhood Location	7
2.	Parcel Ownership	8
3.	Development Phases	10
4.	Public Transportation (Existing)	15
5.	Parking (Existing)	17
6.	Average Weekday Daily Traffic (Existing 1980)	18
7.	Peak-hour Level of Service (Existing 7:30-8:30 AM)	19
8.	Peak-hour Level of Service (Existing 3:30-4:30 PM)	20
9.	Peak-hour Level of Service (Existing 5:00-6:00 PM)	21
10.	Proposed Street Improvements - Phases I and II	23
11.	Percentage Traffic Assignments	35
12.	Traffic Assignments Average Weekday Traffic Site-generated Phases I and II 1985	36
13.	Traffic Assignments AM Peak-hour (Phases I and II 7:30-8:30 to Columbia Point)	37
14.	Traffic Assignments AM Peak-hour (Phases I and II 7:30-8:30 from Columbia Point)	38
15.	Traffic Assignments PM Peak-hour (Phases I and II 3:30-4:30 to Columbia Point)	39
16.	Traffic Assignments PM Peak-hour (Phases I and II 3:30-4:30 from Columbia Point)	40
17.	Traffic Assignments PM Peak-hour (Phases I and II 5:00-6:00 to Columbia Point)	41
18.	Traffic Assignments PM Peak-hour (Phases I and II 5:00-6:00 from Columbia Point)	42
19.	Average Weekday Traffic - No-build 1985	44
20.	Average Weekday Traffic - Phases I and II 1985	45
21.	Traffic Volume Overview - Phases I and II Development	46
22.	Peak-hour Level of Service - No-build and Phases I and II 1985	48

LIST OF TABLES

Table Page

I. Traffic Volumes on Major Project Area Streets and Highway Network 13

II. Levels of Service - Columbia Point Traffic Study Area (Existing) 12

III. Columbia Point Development Program 27

IV. Average Weekday Trip Generation 27

V. Employee/Non-employee Person Trips 29

VI. Percentage of Average Weekday Trips during Peak Hours and Prime Off-peak Hours 29

VII. Peak-hour Person Trips 29A

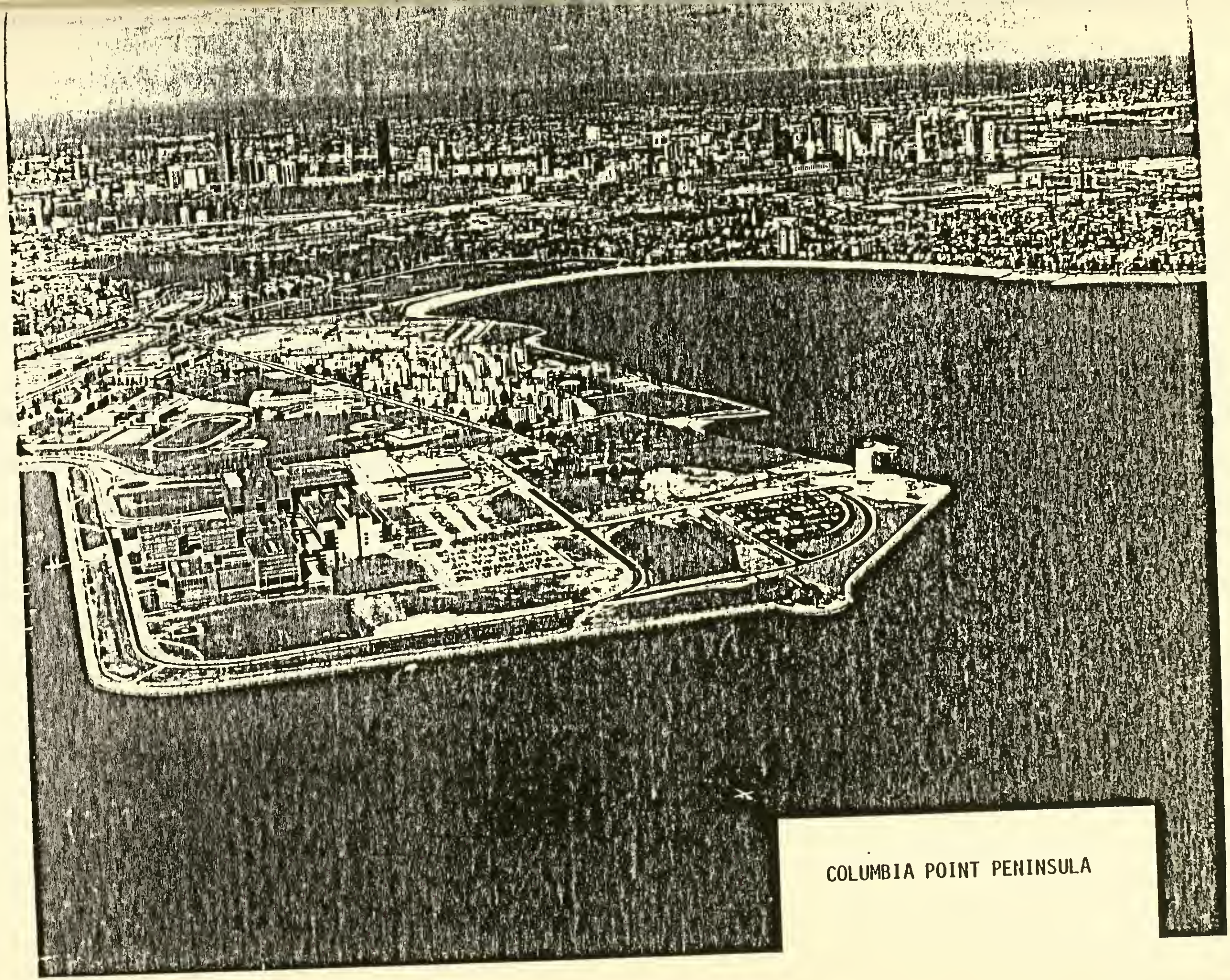
VIII. Modal Split 31

IX. Average Weekday Daily Vehicular Arrivals 31

X. Peak-hour Vehicular Traffic 32

XI. Estimated 1985 Traffic Volumes on Major Project Area Streets and Highway Network Phase I and Phase II 43

XII. Peak-hour Level of Service - No-build Phase I and Phase II 49



COLUMBIA POINT PENINSULA

I. INTRODUCTION

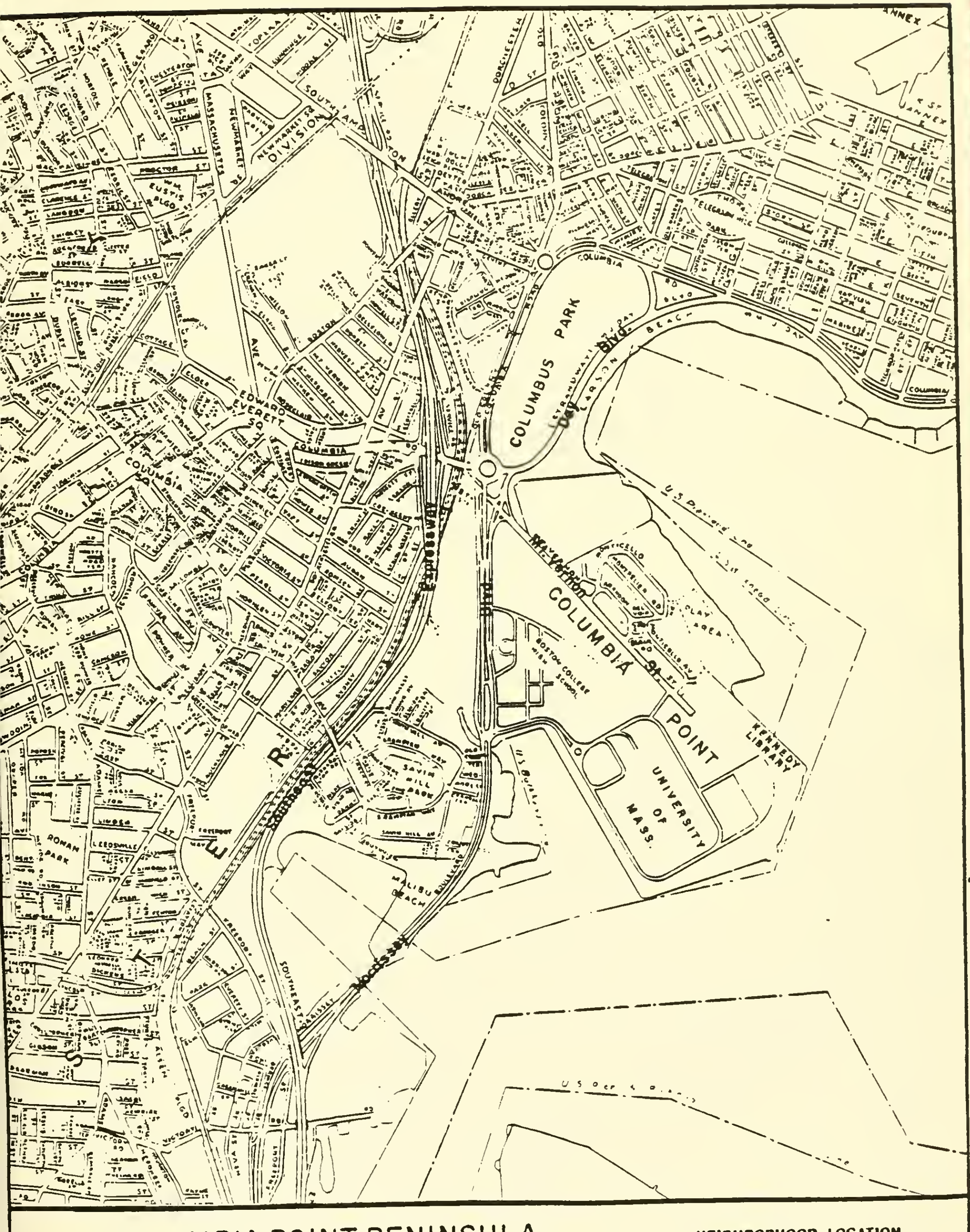
PURPOSE OF REPORT

This report has been prepared to assess the impacts of transportation components of new development activities at Columbia Point. As well as serving as a transportation overview of itself, it provides traffic input for air quality analyses associated with an environmental clearance for an Urban Development Action Grant from the U.S. Department of Housing and Urban Development. Such a grant is earmarked for public improvements and as loans to developers.

SETTING

Columbia Point is located relatively close to Downtown Boston with an attractive shoreline setting on Dorchester Bay (see Figure 1). It has fairly direct access from major roadways such as the Southeast Expressway (I-93), Morrissey Boulevard and Columbia Road. In addition, it is in close proximity to Columbia Station on the Red Line rapid transit. Despite these advantages, large areas of the peninsula remained undeveloped until the 1970's. Schools and viable commercial development were chiefly clustered along Morrissey Boulevard, but the large public housing project, completed in 1953 was (and is) in a serious state of decline and deterioration. The adjacent Bayside Shopping Mall went out of business, leaving only the headquarters of the Boston Teachers' Union.

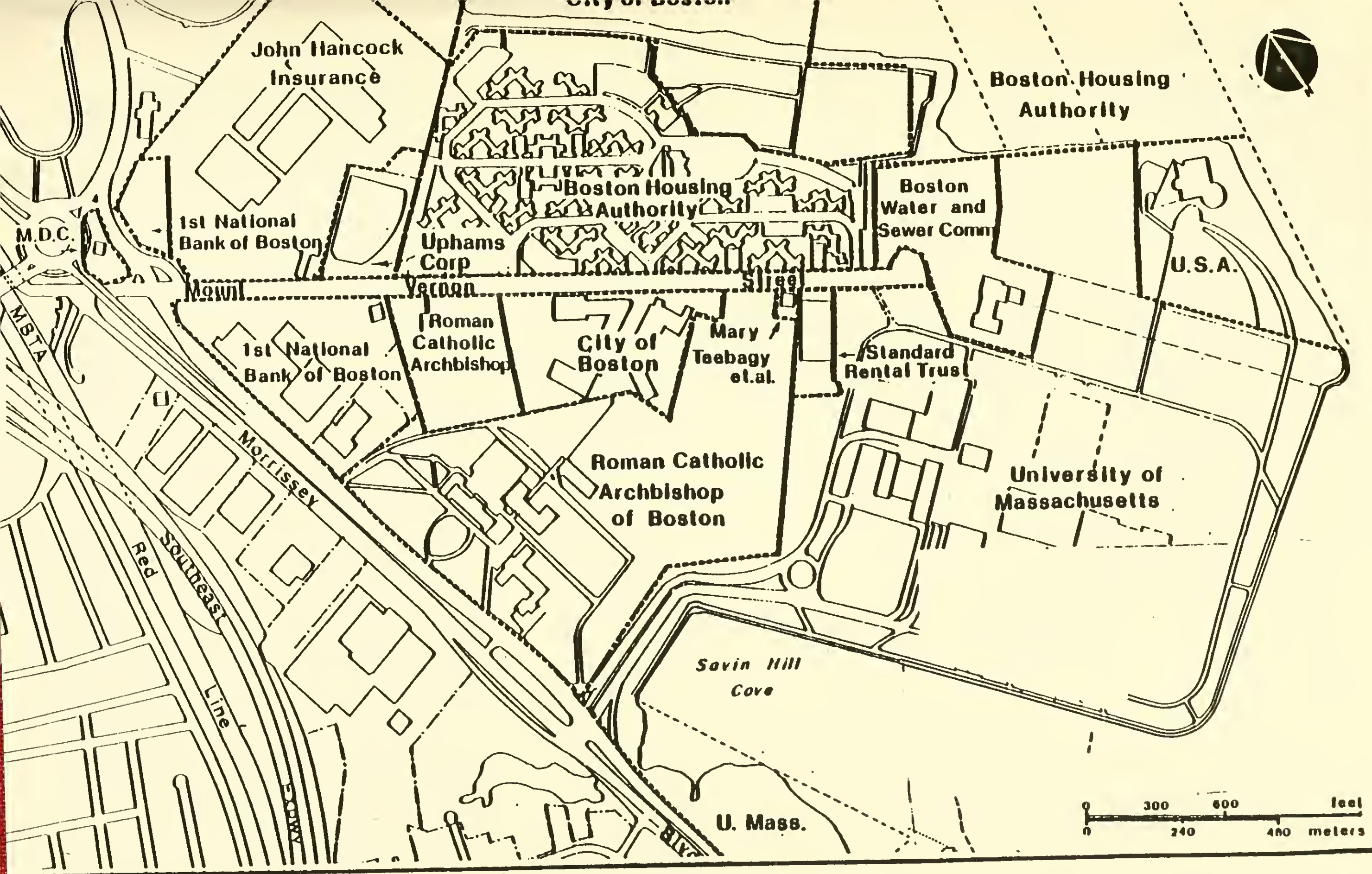
Major new development decisions were made during the 1970's. The University of Massachusetts built its Harbor Campus, now serving about 12,000 students, and the John F. Kennedy Presidential Library was constructed nearby. The State Archives Building is now under construction between U Mass. and the Library. Into this evolving situation actions have been taken among the private sector, Boston Redevelopment Authority, Boston Housing Authority and others to revitalize the former Bayside Mall and the deteriorated housing. This has resulted in the very recent renovation of the Mall as the Bayside Exposition Center and serious planning and developmental efforts for housing. Various land owners on or adjacent to the total Columbia Point Peninsula are shown (see Figure 2), to indicate the various concerns involved or interested in area revitalization. The subject of this report involves transportation impacts associated with redevelopment of the former mall area and the housing project.



COLUMBIA POINT PENINSULA
REVITALIZATION PROGRAM

NEIGHBORHOOD LOCATION

Figure: 1



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

PARCEL OWNERSHIP

Figure: 2

DEVELOPMENT PROGRAM

The new development is divided into two phases, one involving the former Bayside Mall property and the other, the public housing holdings of the Boston Housing Authority, as follows (see Figure 3):

Phase I - Bayside Exposition Center

	Gross Sq. Ft.
Exhibition Space	220,000
Permanent Apparel Showrooms	72,000
TOTAL	292,000 Sq. Ft.

(In addition the Boston Teachers Union headquarters will continue to occupy a building of about 33,000 sq. ft.).

The exhibition space opened for business early in January this year, while the apparel showrooms will not be in operation for several months.

Phase II - Boston Housing Authority Area

Mixed Residential Housing	1600 units

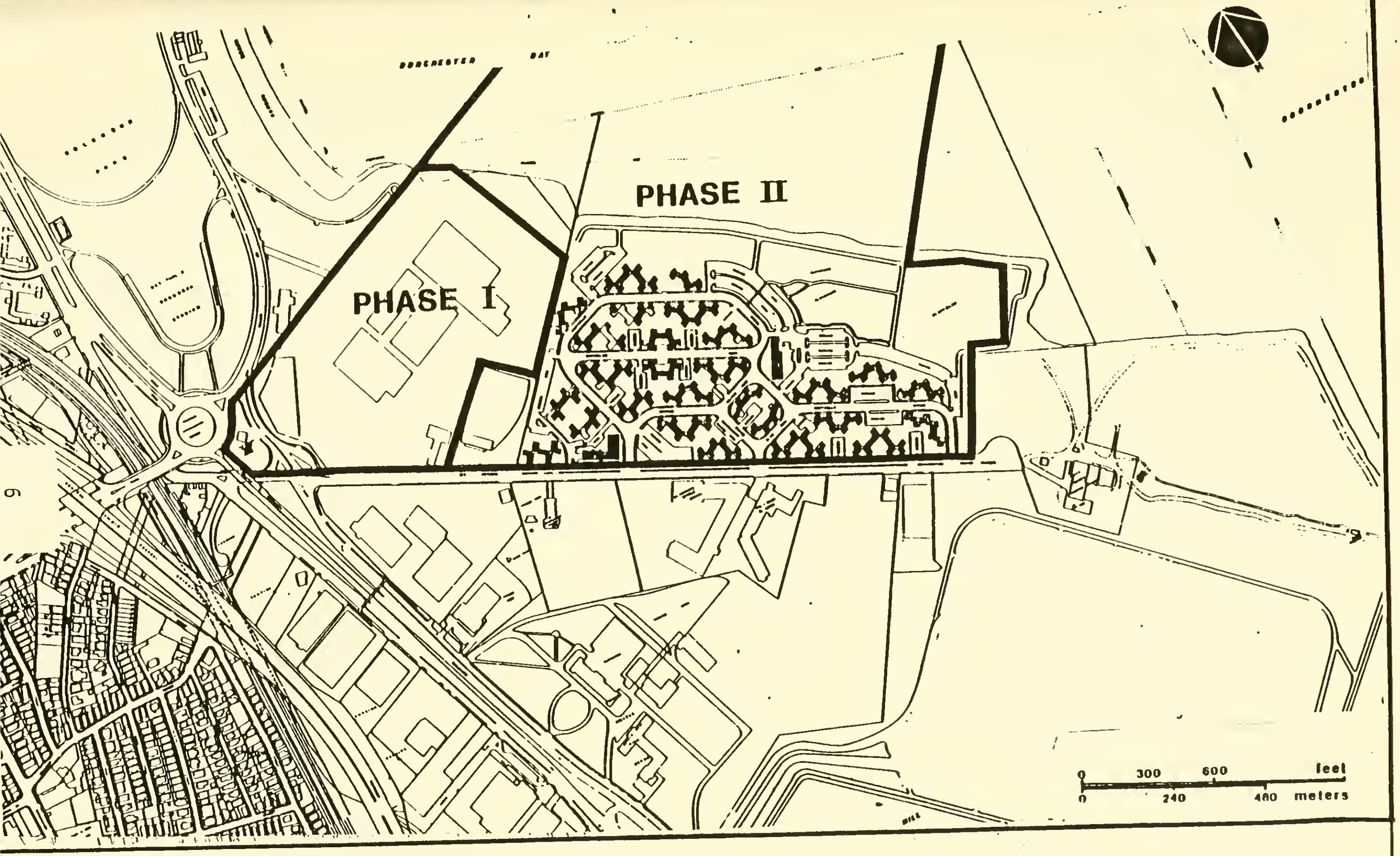
(Of the above, about 400 units are currently occupied).

The new development is expected to have 400 low income, 400 moderate income and 800 market rate units, contingent in part on the development proposals being made. Second stage submissions are currently being prepared by prospective developers, with selection expected by early summer 1983. It is hoped that some physical work can be started by the end of 1983 with possible completion in 1985.

INITIAL EXPERIENCE WITH THE BAYSIDE EXPOSITION CENTER

The Bayside Exposition Center opened for operation early in January 1983, so an indication of attractiveness was obtained. The first show, the Custom Car Show, has been, in the past at other locations, second only to the Flower Show in attendance. The show was open for three days, a Friday, Saturday and Sunday with a total attendance of 62,000 persons and a peak day on Sunday of 27,000 persons.

The estimates in this report envision a typical weekday Exposition Center attendance as 8700, certainly much less than the Custom Car Show Sunday attendance of 27,000 and the average of Friday and Saturday of 17,500. It is believed that the Custom Car Show's initial experience represents an untypically high situation. In addition, it is heavily weighed toward weekend attendance, which is much higher than weekday. Weekday attendance, which is coupled with general weekday commuter, commercial and business travel, was chosen for the purposes of this report to represent typical conditions where total traffic would be higher on a regular basis. It was therefore decided that the basis for estimating typical future Exposition Center traffic should not be altered on the basis of limited initial experience.



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

DEVELOPMENT PHASES

Figure: 3

The Sunday show during several afternoon hours generated excessive congestion. Part of the reason was related to the capacity constraint imposed on entering the parking lot caused by the act of collecting a parking fee. The reconstruction narrowing of the Columbia Road bridge was another major factor, while the lack of control on indiscriminate on-street parking contributed to the confusion. It is felt that many management lessons were learned and that future operations will be improved by management measures at the Center, promotion, police enforcement and interagency cooperation, including the eventual completion of bridge construction.

II. EXISTING CONDITIONS

STREET & HIGHWAY NETWORK

Access to Columbia Point is made by various roadways with the Southeast Expressway being the major highway serving the area. Access ramps from the Expressway to Columbia Road are to the west of Kosciuszko Circle, which connects to Old Colony Boulevard, William J. Day Boulevard and Morrissey Boulevard.

The principal local street that serves the study area is Mt. Vernon Street and connects the Bayside Mall to Day Boulevard and Morrissey Boulevard to the west and to the public housing area to the east, ending in a cul-de-sac. Traffic volumes range between 4,000 to 6,000 vehicles per day.

Traffic volumes on major project streets and the highway network in the Columbia Point area for peak hours, 8-hour and Average Weekday Traffic (AWDT) are indicated on Table I and Figure 6.

*Levels of Service (LOS) at key intersections within the project area for morning, afternoon and evening peak hours are indicated on Figure 7 to Figure 9, and range from Level of Service "A" at three locations to Level of Service "F" at U-Mass - Morrissey Boulevard during the more critical A.M. peak period of 7:30 A.M. to 8:30 A.M. as indicated on Table II. The other hours show generally better Levels of Service.

Table II

Levels of Service - Columbia Point Traffic Study Area

Intersection	Level of Service 7:30-8:30	 3:30-4:30	 5:00-6:00
Columbia Rd. - Expressway northbound off-ramp	C	B	D
Columbia Rd. - Expressway southbound off-ramp	E	C	C
Wm. J. Day Blvd. - Wm. J. Day Blvd. Connector	A	C	C
Old Colony Blvd. - Morrissey Blvd. southbound on-ramp	A	B	A
Mt. Vernon St. - Wm J. Day Blvd. Connector	A	A	A
U-Mass - Morrissey Blvd.	F	C	A

---

*Levels of Service are based on volume-capacity ratios according to the Highway Capacity Manual (Highway Research Board, 1965). Levels range from A to F, with A representing free-flow traffic and excellent service conditions and F representing forced-flow, stop-and-go traffic and jammed conditions. Urban traffic conditions are considered acceptable if they are at LOS C or better.

Table I

Columbia Point Revitalization Program

Traffic Volumes on Major Project Area Streets and Highway Network

Street	AM Peak 7:30-8:30 AM	Off-Peak 3:30-4:30 PM	PM Peak 5:00-6:00 PM	8-Hour 10 AM-6 PM	AWDT
Southeast Expressway					
Southbound ramp	750	600	420	4980	9700
Northbound ramp	480	240	240	2120	4000
Columbia Road					
Eastbound	1130	790	1030	6600	13,600
Westbound	930	1320	850	6180	14,500
Wm. J. Day Boulevard					
Eastbound	730	490	380	6570	8500
Westbound	600	1120	1070	4588	11,450
Wm J. Day Boulevard Connector					
Northbound	500	560	330	2470	8050
Southbound	520	450	550	3370	5120
Morrissey Blvd. Off-ramp					
Mt. Vernon Street Connector					
Eastbound	70	40	10	340	590
Westbound	280	420	190	1380	3310
Morrissey Boulevard					
Northbound	3900	960	780	12,590	22,610
Southbound	1260	1541	2570	10,500	27,730
Old Colony Ave.					
Mt. Vernon Street Connector					
Eastbound	360	1040	978	2940	6260
Westbound	590	770	514	3950	8870

Source: BRA Transportation Planning Department

PUBLIC TRANSPORTATION

Public transportation serving the Columbia Point area can be grouped into three categories (see Figure 4):

1. Red Line Rail Rapid Transit
2. MBTA Surface Bus
3. U-Mass Shuttle Bus

1. Red Line Rail Rapid Transit

Rail rapid transit is provided to the Columbia Point area by the MBTA's Red Line. Four Red Line tracks pass through the existing Columbia Station area providing two types of trips to the Columbia Point area. From the South Shore, patrons must ride the Red Line's Harvard-Braintree train north through Columbia Station to Andrew Station and transfer to a southbound Dorchester branch train and ride one stop back to Columbia Station. As from the south, patrons from the north use only Dorchester branch trains to stop at Columbia, as the Braintree trains at present can only pass through Columbia.

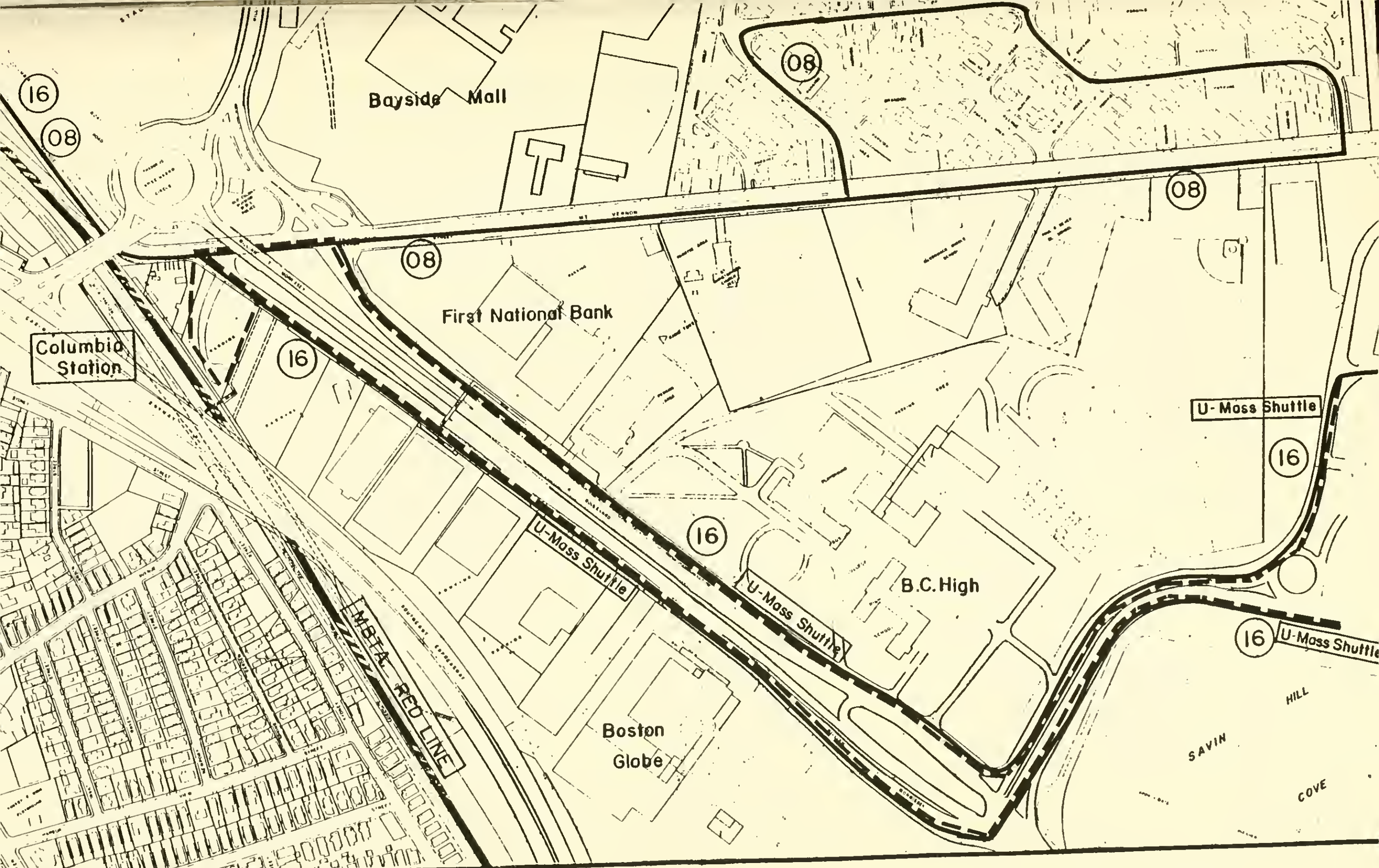
2. MBTA Surface Bus

MBTA bus service is provided by route 08 (Columbia Point to Dudley Station). This route goes directly into Columbia Point via Andrew Station using Mt. Vernon Street with headways of approximately 30 minutes.

Route 16 (Forest Hills - U-Mass) service is provided during morning and evening peak hours, has headway times of approximately 20 minutes, and runs via Columbia Road-Morrissey Boulevard - U-Mass Road and returns stopping at Columbia Station.

3. U-Mass Shuttle Bus

U-Mass currently operates its own shuttle service between its harbor campus on the peninsula and the rapid transit station at Columbia with headways of 2 to 3 minutes during peak periods and 12 minutes on off-peak hours. The hours of operation are 6 A.M. to 10:30 P.M. In addition, there is shuttle service from Downtown Boston (Park Square) via the City Hospital area to the harbor campus. This service has headways of up to 30 minutes. The average daily ridership for the U-Mass shuttle is between 10,000 and 11,000 persons.



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

PUBLIC TRANSPORTATION
(Existing)

Figure: 4

PARKING

Existing travel to Columbia Point is served by the following parking (see Figure 5):

University of Massachusetts	1623 spaces
Morrissey Boulevard Commercial	1650 spaces
Bayside Mall Site	1850 spaces
Columbia Point Housing	1200 spaces
Kennedy Library	300 spaces

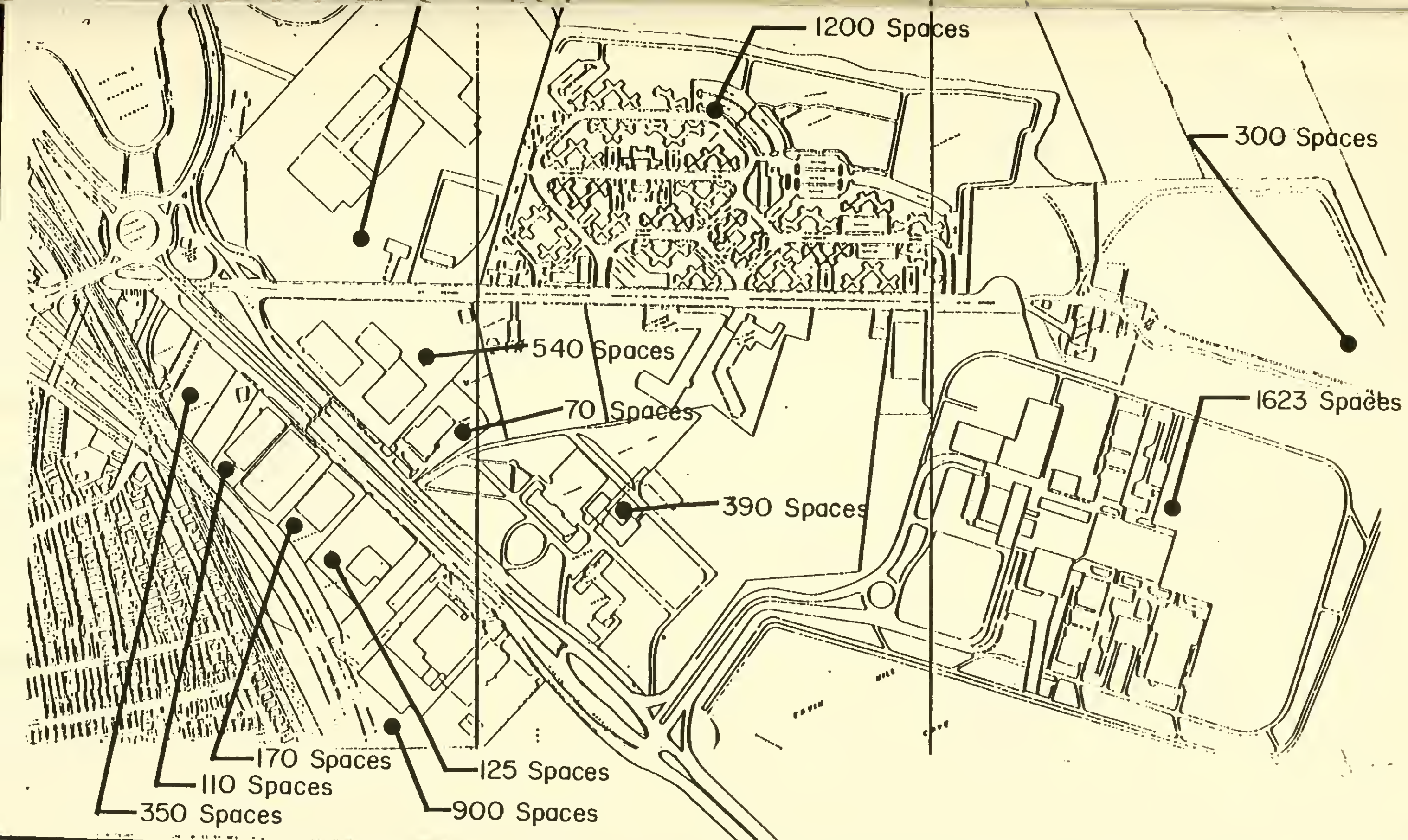
Although the parking spaces for the University of Massachusetts and the established Morrissey Boulevard commercial uses are well utilized, the Columbia Point housing spaces suffer from very low use due to the diminished population. The First National Bank and the Boston Teachers Union park autos on the Bayside Mall site, along with employees and patrons of the recently opened Bayside Exposition Center.

PEDESTRIAN CIRCULATION

The major pedestrian approaches to the Columbia Point study area are via Mt. Vernon Street from William J. Day Boulevard, Morrissey Boulevard and Old Colony Avenue. The principal link from Columbia Station is Mt. Vernon Street. There is no clearly defined pedestrian link to the area other than a foot-bridge on Morrissey Boulevard that connects commercial uses on Morrissey Boulevard and Columbia Station to Boston College High School and the Channel 56 TV facility. Major pedestrian activity occurs at this location during commuter and school access hours.

WATER TRANSPORTATION

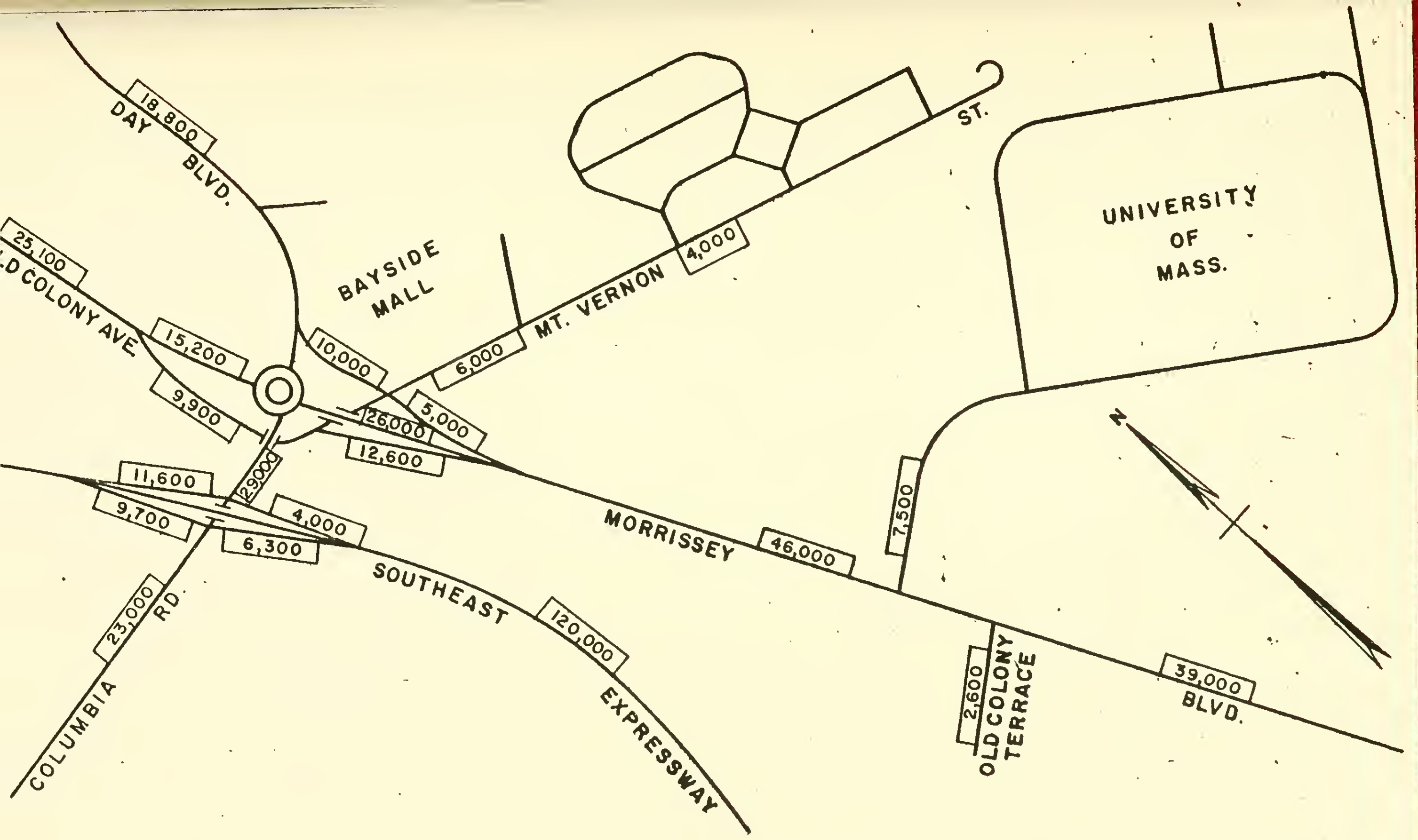
There is no commercial/pleasure boat usage around the Columbia Point study area, except for a small dock and mooring area at U-Mass at Savin Hill Cove. Just to the south is the Savin Hill Yacht Club and further to the south on Dorchester Bay Basin inside of Morrissey Boulevard is the Dorchester Yacht Club.



COLUMBIA POINT PENINSULA
REVITALIZATION PROGRAM

EXISTING PARKING

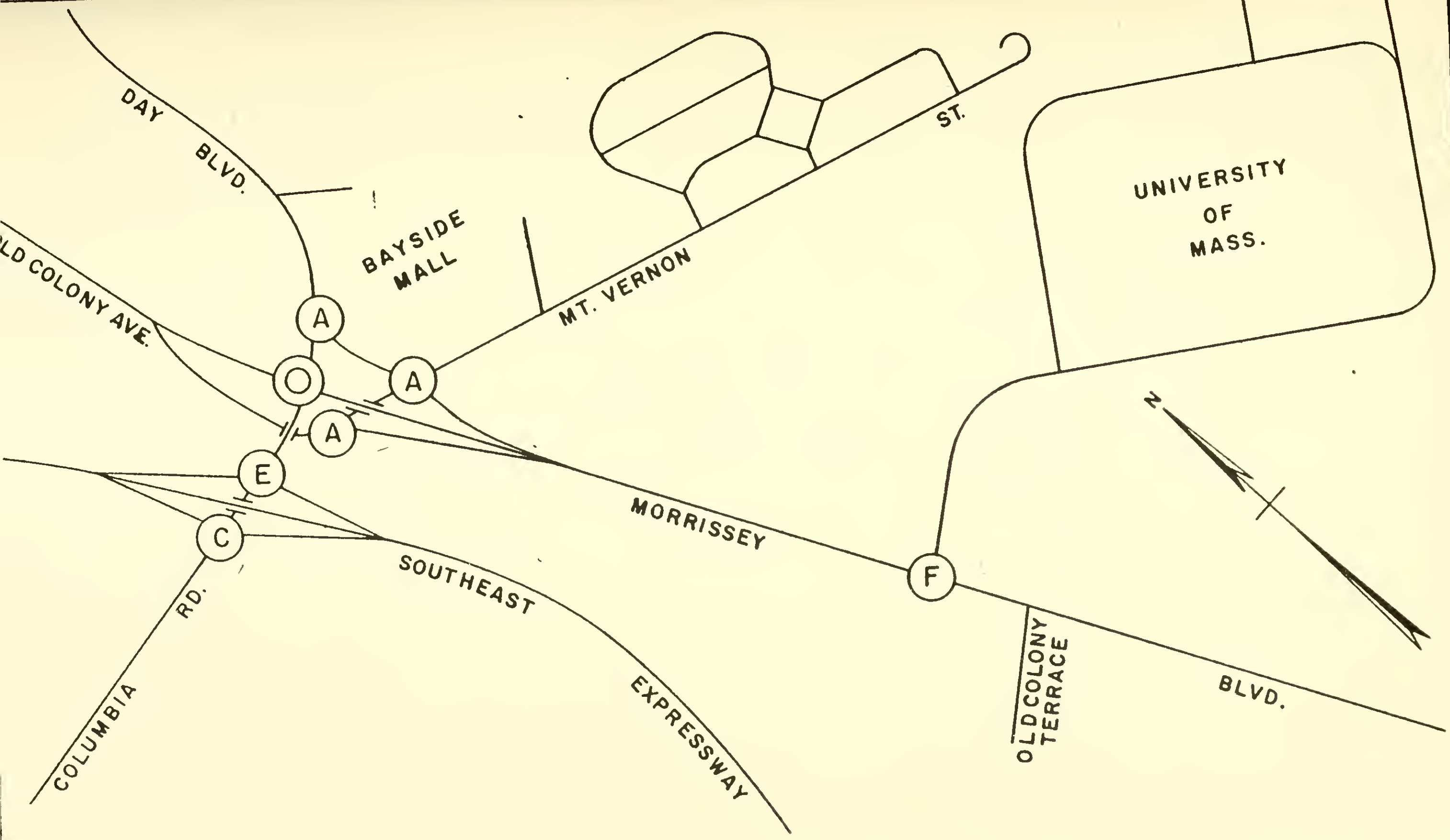
Figure 5



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

AVERAGE WEEKDAY TRAFFIC
EXISTING 1980

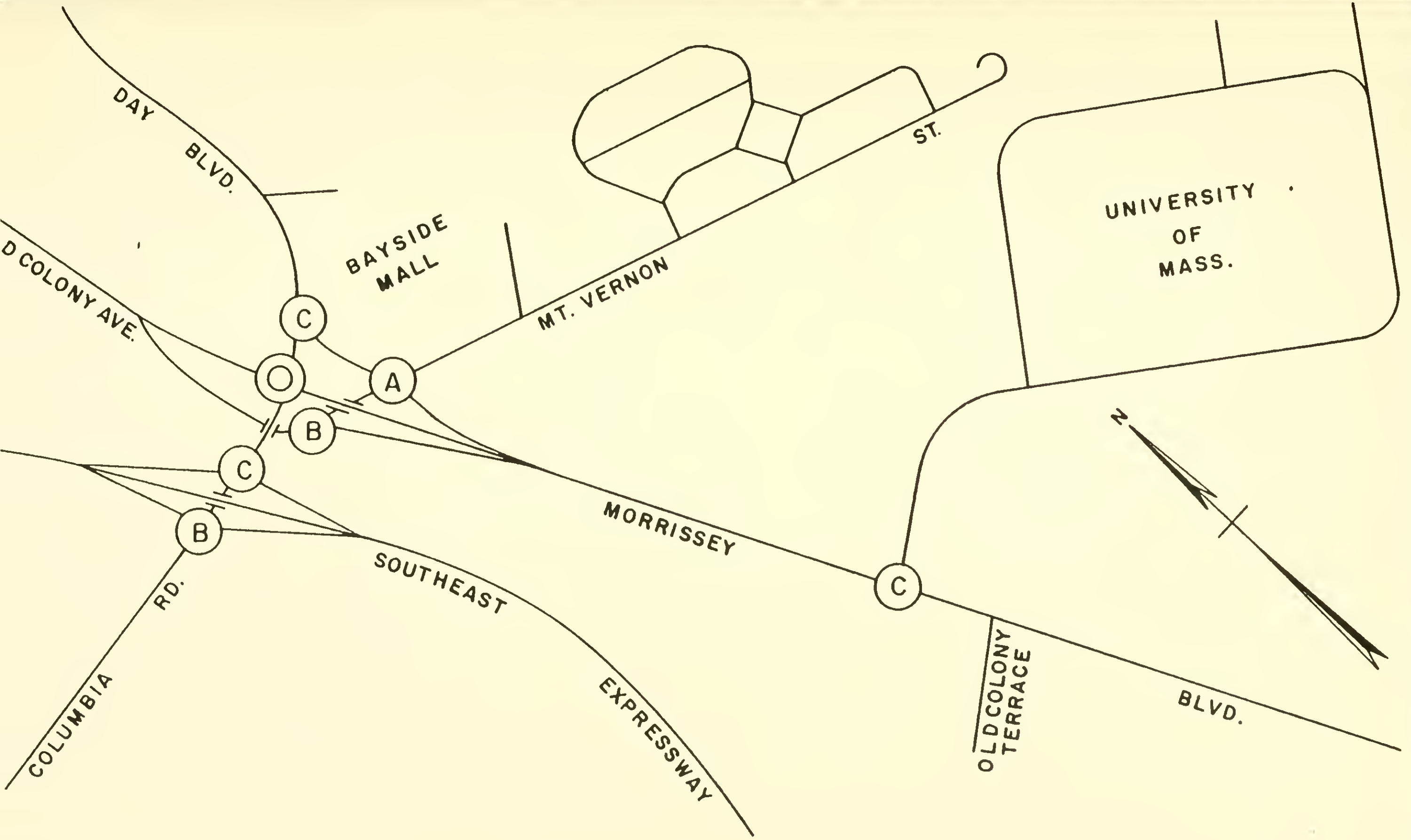
Figure: 6



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

PEAK HOUR LEVEL OF SERVICE
1980 Existing 7:30 - 8:30 AM

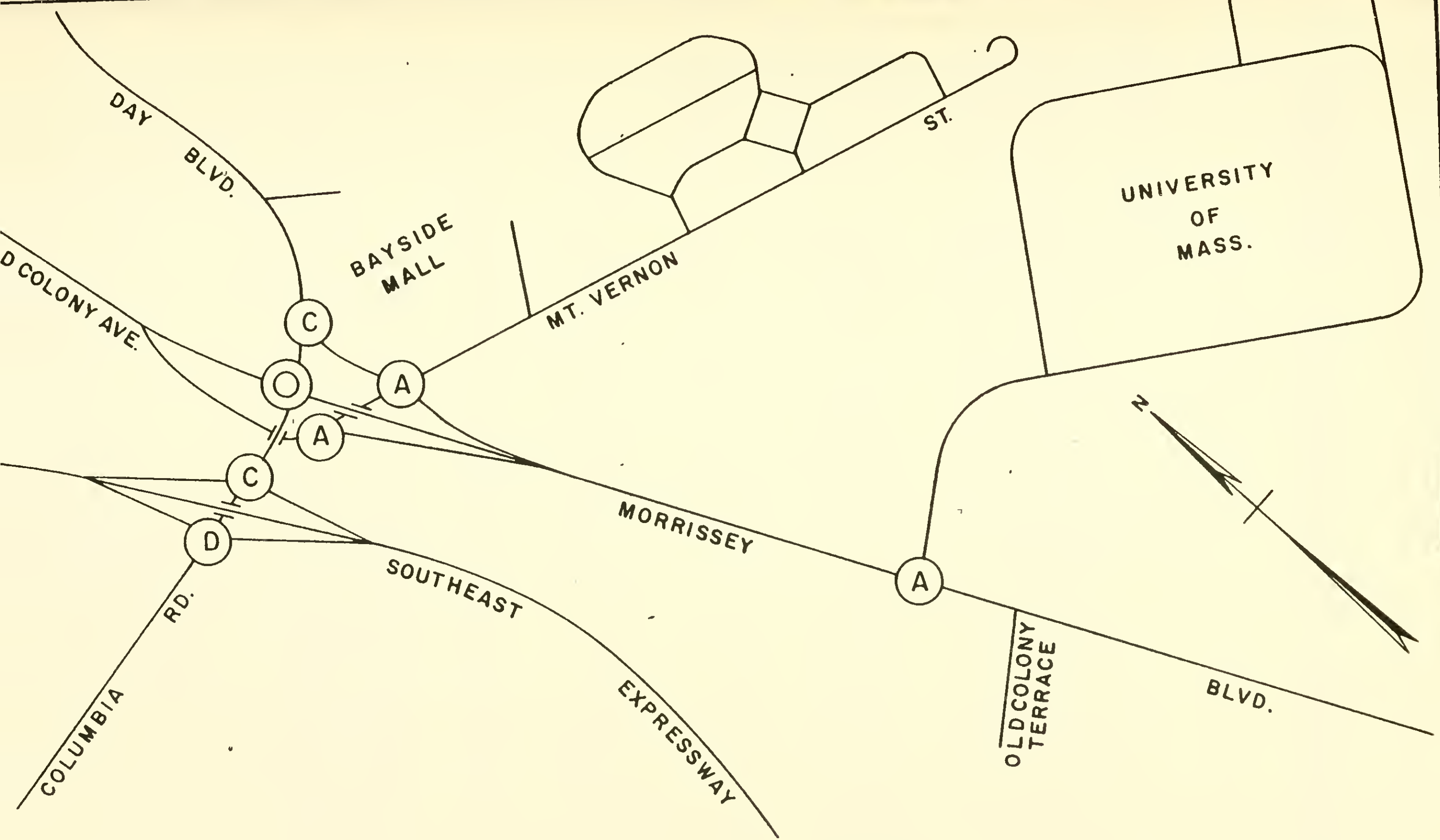
Figure: 7



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

PEAK HOUR LEVEL OF SERVICE
1980 Existing 3:30-4:30 PM

Figure : 8



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

PEAK HOUR LEVEL OF SERVICE
1980 Existing 5:00-6:00 PM

Figure: 9

III. PROPOSED TRANSPORTATION IMPROVEMENTS

ROADWAY CHANGES

Columbia Point is quite isolated from the larger community and this isolation is highlighted by the awkward, unimposing access at the intersection of William J. Day Boulevard and Mt. Vernon Street - William J. Day Boulevard Connector, and by the lack of vehicular access from Mt. Vernon Street to the Kennedy Library - U-Mass end of the peninsula. A substantially intensified Columbia Point Peninsula Revitalization Program indicates the need for changes in both these situations.

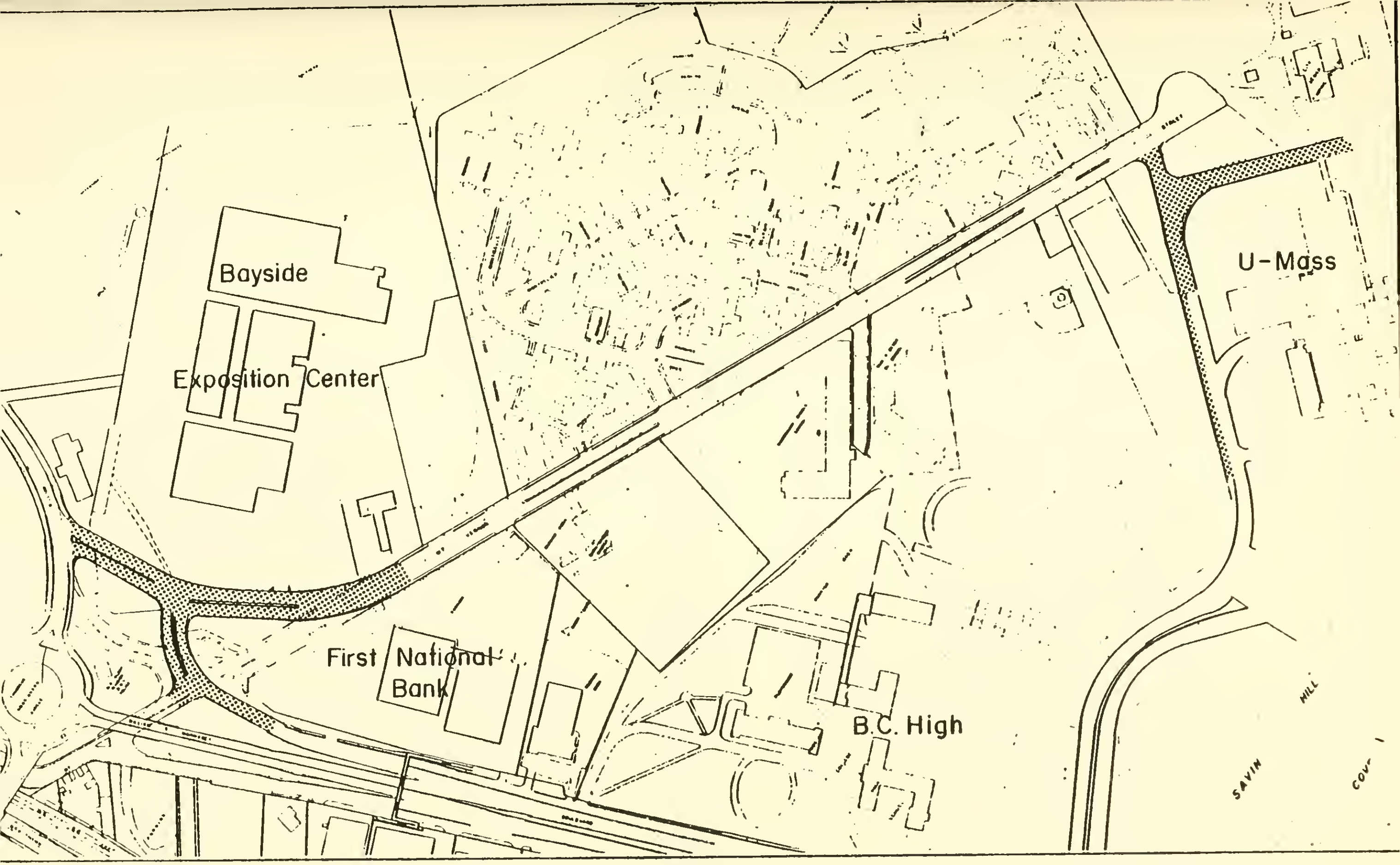
A new, more direct and attractive entrance from William J. Day Boulevard, capable of more efficient traffic operations and providing a stronger connection to the outside community, is desirable for the success of the entire development program. This entrance can be better utilized if connected via Mt. Vernon Street to the southern (Kennedy Library - U-Mass) end of the peninsula by a vehicular and pedestrian link.

The principal roadway improvements proposed for the Columbia Point Peninsula Revitalization Program to achieve the above are shown in Figure 10 and include the following:

a. The relocation of the Mt. Vernon Street entrance on William J. Day Boulevard, about 200 feet easterly from Kosciuszko Circle by means of a (approximately 1,000-foot) relocated connector to existing Mt. Vernon Street and a redefined connector to Morrissey Boulevard and Old Colony Avenue.

b. The reconstruction of the connector from the southerly end of Mt. Vernon Street to the Kennedy Library - U-Mass portion of the Columbia Point peninsula.

c. As a second stage roadway improvement, the reconstruction of Mt. Vernon Street between the new Day Boulevard Connector (a. above) and the U-Mass roadway link (b. above) is envisioned. This reconstruction would be keyed to the redevelopment of the housing project and would include safety, environmental, landscaping and urban design features which would not compromise its ability to accommodate vehicular traffic demands.



PROPOSED STREET IMPROVEMENTS

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

Figure: 10

FUTURE PUBLIC TRANSPORTATION

Red Line Improvements

The public transportation improvements that are proposed for Columbia Point involve the MBTA Red Line service at Columbia Station. The station is to be rebuilt to allow Braintree trains to stop at an additional platform integrated with Dorchester branch service. This will result in a doubling of service for patrons from the north and eliminate a transfer and backtracking from the South Shore. The components of the new station are: a new platform (440 feet long); a new pedestrian bridge; a new bus transfer lobby; a new station lobby over the South Shore tracks and alterations to the existing station lobby over the Dorchester branch tracks; the installation of approximately 1400 feet of track; a new trainman's lobby with connections to the existing platform; park-and-ride spaces; landscaping and signage for the new station. The bus loop and auto drop-off will be elevated to better serve access to trains.

MBTA Surface Bus Routes

Routes 08 and 16 buses will continue to operate, and any increases in service will be contingent on further study by the MBTA for future demand in ridership.

Shuttle Bus

The U-Mass shuttle bus will continue to operate between the hours of 6:00 AM and 10:30 PM and will benefit from the proposed new bus loop at Columbia Station. A new or revised shuttle service to accommodate the new development must be seriously considered.

FUTURE PARKING SUPPLY

Existing and future travel for the Columbia Point study area will be served by nearly 6,000 parking spaces. Although the parking spaces for U-Mass, Kennedy Library and the established Morrissey Boulevard commercial uses are well utilized, it is not envisioned that a drastic increase in parking will be needed at this time. However, future plans responding to a large increase in patrons attending the Exposition Center as well as possible retail and commercial activity in the vicinity could point to a structured parking facility located on the waterbed factory site.

PEDESTRIAN CONNECTIONS

The Columbia Point development proposals will provide for pedestrian circulation improvements. Besides widened sidewalks along peripheral streets, major traffic-free walkways are proposed within the housing development and along the shoreline. The roadway improvements being funded by the UDAG will include new sidewalks, lighting, crosswalks and traffic signal controls. The increase in activity in the area should also lead to less isolated walking circumstances with a resultant increase in security.

BOAT USAGE & SERVICE

The final component of the Columbia Point Revitalization Program is expected to include a new boat marina and a possible water taxi that would be used to link up the various peninsula land uses with various activity centers in the Downtown area of Boston Harbor. Due to the need for dredging and physical improvements to the shoreline, not yet programmed, boat service is still in the preliminary planning stage.

NO-BUILD ALTERNATIVE

Under the no-build alternative, there would be no changes or improvements on the street and the highway system of a significant nature. It is, however, expected that the Columbia Station improvements to provide Braintree Branch direct service will be implemented whether or not roadway changes occur. The Station improvements include, as noted earlier, improved shuttle bus connections at the station and a park-and-ride lot.

The no-build condition as analyzed in this report also assumes that no new land development takes place, i.e. Phase I and Phase II of the development program do not occur. Thus the no-build option means no new development, no roadway improvements, but a realization of the Columbia Station plans.

IV. ESTIMATE OF FUTURE TRAFFIC

METHOD

Future travel generated by Phase I and II development was estimated by taking the proposed development program and applying suitable travel generation rates for the activities involved and obtaining person and vehicular travel which is assigned to available transportation facilities. The development-generated travel is added to traffic levels which allow for some growth in existing levels, which would occur apart from the proposed development. In this report we have increased general traffic by 0.5% per year from the base year (1980) to the future year when improvements are expected to be completed (1985). The estimation process, which is typical for developmental travel predictions, includes the following steps:

- Person Trip Generation, by Employee and Non-employee
- Peak/Off-peak Period Distribution
- Modal Split
- Vehicle Occupancy Rates
- Trip Distribution to Approach Corridors
- Trip Assignment to Transportation Facilities

These steps, as applied to the Bayside and housing sites for various periods in a typical day, are set forth in a number of Tables (III to X) and are discussed below.

PERSON TRIP GENERATION

The proposed development consists of three main components -- 220,000 gross square feet of exhibition space for trade and gate shows, 72,000 gross square feet of garment showrooms and 1600 units of mixed income housing (400 low income, 400 moderate income and 800 market rate). The Teachers Union Building at Bayside is a continuing use, whose travel is included in existing traffic volumes. 400 low income units now exist, so travel estimation is for 1200 additional dwelling units.

Trip generation rates for the exhibition space were based in part on the patronage experienced at shows at Commonwealth Pier before the Pier closed in mid-1982. The Bayside Center is intended to attract many shows which used to be held at the Pier, such as the Flower Show, Home Show, Boat Show, etc. The weighted average daily number of cars parked at the MassPort parking lot serving Commonwealth Pier during shows in the first half of 1982 was about 1000 cars ranging from a low of about 530 (Cycle Show) to almost 1700 cars (Flower Show) per day. It was decided that a representative peak day would be 50% greater than the weighted average or 1520 cars. Assuming an average car occupancy of 2.5, 3800 persons would arrive at the MassPort parking facility during a typical peak day.

Certainly, everyone attending a Commonwealth Pier show did not use the main parking lot. Some would come by bus, others would park on-street, while a few would conceivably walk. For analyses purposes, and lacking other information, the persons estimated arriving at the MassPort lot on a representative peak day were doubled to yield a measure of peak attendance, in this case, 7600 persons. This was used as a typical daily show attendance for the Bayside Center exhibition hall activities. This attendance would represent a person trip generation of 34.5 person arrivals per 1000 square feet at Bayside. It may be of interest to note that the person arrivals per 1000 square feet per day at the Jordan Marsh department store are about one-half this amount. Of the total estimated person arrivals for the exhibition activity, it is assumed that there is one employee for every 20 visitors.

Table III

Columbia Point Development Program

	Phases I and II
Bayside Exposition Center (square feet)	220,000 sq. ft.
Garment Showrooms (square feet)	72,000 sq. ft.
Residential (units)	1200 units

Table IV

Columbia Point Average Weekday Person Trip Generation

	Phases I and II	
	Arrival Rates Per Day	Daily Person Arrivals
Bayside Exposition Center	34.5/1000 sq. ft.	7600
Garment Showrooms	15.3/1000 sq. ft.	1100
Residential	4.0/unit	4800
TOTAL		13,500

For the up to 220 garment sample rooms, trip generation was estimated at an average of one employee and four customer arrivals per day, for a total of about 1100 daily arrivals. This results in about 15.3 person arrivals per 1000 square feet per day, comparing well with arrivals at retail establishments. Due to the sometimes sporadic operation of showrooms, this activity level could be on the high side.

The total person arrivals estimated for the exhibition activity when a show is in operation and the garment sample rooms amount to 8700 per day.

Trip generation for the proposed housing was estimated at 4 person arrivals per day per additional (1200) housing unit. This represents a rate which is typical for urban apartment living and yields 4800 person arrivals. Adding this to the Bayside site new trip generation produces 13,500 person arrivals per day or 27,000 person arrivals and departures. A summary of person trip generation is presented in Table IV.

PEAK/OFF-PEAK PERIOD DISTRIBUTION

Within the typical daily travel, it is necessary to establish travel variations, in particular the peak and off-peak hours access and egress, relative to the operation of transportation facilities serving the development. To do this, the way the development operates with respect to various schedules must be assessed.

The percentages of average daily trips taking place during morning and evening land development peak hours as well as a highest off-peak hour are shown in Table V, by employee and non-employee and by activity. The nature of the Exposition Center is such that visitor (non-employee) trip making is predominant. The fundamental assumption regarding the Center is, however, that events are continuing shows leading to a fairly even flow during the entire day. This means that events like concerts or sporting events, which can discharge the entire capacity of the center at one time, are not envisioned. The garment sample rooms are assumed to be open from "9 to 5" with the employees coming and going chiefly during the morning and evening traffic peak hours, with customers spread out during the day. The coincidence of the employee peak hour with general traffic peak hour would slightly exagerate volumes, as the general peak hours occur from 7:30 to 8:30 A.M. and from 3:30 to 4:30 P.M., as noted earlier in this report. Residential trip making is highly oriented to the regular commuting peak hours, morning and evening.

The exhibition area is considered to be open days and evenings, with employees arriving in the morning, with a partial work shift change in the late afternoon. Visitors are considered to arrive and depart throughout open hours. It should be noted that the analyses of traffic deal with a representative weekday when a show is in progress, and the manner in which the Bayside Center contributes to weekday traffic. In fact, many of the very highest attendance days for exhibition activities will be on weekends. Overall peak traffic periods on weekends should, however, be lower than on weekdays when commuter and general commercial traffic occurs and when the garment sample rooms operate, albeit with a relatively small contribution to traffic.

In viewing the results of Table VII, it can be seen that the estimated development peak hour of person travel occurs from 5 P.M. to 6 P.M., amounting to about 3100 person arrivals and departures or just over 11% of the 27,000 daily person "ins and outs" (13,500 x 2).

Table V

Employee/Non-employee Person Trips

	Phases I and II	
	% of Trips	Average Weekday Person Arrivals
Bayside Exposition Center		
Employee	5%	380
Non-employee	95%	7220
Garment Showrooms		
Employee	20%	220
Non-employee	80%	880
Residential		
Employee	2%	380
Non-employee	98%	7220
Total		
Employee		696
Non-employee		12,804

Table VI

Percentage of Average Weekday Trips during Peak Hours and Prime Off-peak Hours

Phases I and II

	Arrive			Depart		
	7-8 AM	Off-peak	5-6 PM	7-8 AM	Off-peak	5-6 PM
Bayside Exposition Center						
Employee	55	0	25	0	0	25
Non-employee	0	15	15	0	15	15
Garment Showrooms						
Employee	55	0	0	0	0	55
Non-employee	0	15	5	0	15	15
Residential						
Employee	25	5	5	5	5	25
Non-employee	0	5	55	55	5	0

Table VII

Peak-hour Columbia Point Person Trips

	AM Peak-hour Arrive		PM Peak-hour Depart	
	8-9 AM	5-6 PM	8-9 AM	5-6 PM
Bayside Exposition Center				
Employee	105	48	0	48
Non-employee	0	758	0	758
Garment Showrooms				
Employee	61	0	0	61
Non-employee	0	31	0	92
Residential				
Employee	9	2	2	9
Non-employee	0	1294	1294	0
Total				
Employee	175	50	2	118
Non-employee	0	2083	1294	850
	175	2133	1296	968

MODAL SPLIT

In order to assess the demands placed on the various portions of the total transportation system, it is necessary to convert person trips into those travelling by various modes -- auto, public transportation or other. For the Bayside Center, it is estimated that, for employees, about 50% would arrive by car, 40% by public transportation and 10% would walk (or cycle). For visitors it was assumed that 70% would come by car with 30% by transit with negligible walk-ins. It can be noted that 58% of the visitors arriving at a home entertainment show (Tech HiFi) at the Hynes Auditorium on a weekday arrival by car, as surveyed in October 1982.

For housing generated trips, it was estimated that residents (non-employee) would travel 50% by car, 40% by transit and 10% by foot, with the corresponding values for housing employees being 40%, 50% and 10%.

The results of the modal split calculations for Phases I and II are presented in Table VIII. Of the total 13,500 daily person arrivals, it can be seen that 8359 persons arrive by auto, with the remainder by transit or walking.

TRIP DISTRIBUTION TO APPROACH CORRIDORS

The development travel includes the total Boston urbanized area and beyond so that trips generated will come from all the various transportation corridors. In assessing the distribution of travel, the following division of origins was used (based on Program for Mass Transportation -- April 1977):

Origin Corridor or Area	Percent Origins
Downtown Core Area/South Boston	17
Northeast	9
North	15
Northwest	14
West	16
Southwest	12
Southeast	17
Total	100

TRIP ASSIGNMENT TO THE TRANSPORTATION SYSTEM - PERSONS & VEHICLES

To establish the number of cars utilized for access, it was necessary to convert auto person trips to autos, via vehicle occupancy factors. In this case, a vehicle occupancy factor of 2.5 was applied to exhibition visitors, while a value of 1.3 was used for all other cases.*

For distribution of these cars onto access roadways serving the development, the origin corridor proportions were assigned to facilities as follows:

Roadway	% Traffic Assigned
I-93/Southeast Expressway North	43
Old Colony Boulevard	10
Day Boulevard	10
Columbia Road	12
I-93/Southeast Expressway South:	
Freeport Street Ramp to Morrissey Boulevard	20
Columbia Road Ramp	5
	100

Table VIII

Modal Split

Phases I and II

	Percentages			Average Weekday Person Arrivals			
	Auto	Transit	Walk	Auto	Transit	Walk	Total
Bayside Exposition Center							
Employee	50	40	10	190	152	38	380
Non-employee	70	30	0	5054	2166	0	7220
Garment Showrooms							
Employee	50	40	10	110	88	22	220
Non-employee	70	30	0	616	264	0	880
Residential							
Employee	40	50	10	37	49	10	96
Non-employee	50	40	10	2352	1882	470	4704
Total							
Employee				337	289	70	696
Non-employee				8022	4312	470	12,804
				69%	30%	1%	

Table IX

Average Weekday Daily Columbia Point Vehicular Arrivals

	Phases I and II	
	Auto Persons	Auto
Bayside Exposition Center		
Employee	190	150
Non-employee	5054	2020
Garment Showrooms		
Employee	110	90
Non-employee	616	470
Residential		
Employee	37	28
Non-employee	2352	2138
Total		
Employee	337	268
Non-employee	8022	4628

Table X

Peak-hour Columbia Point Vehicular Traffic

Phases I and II

	AM Peak Hour		PM Peak Hour	
	To	From	To	From
Bayside Exposition Center				
Employee	83	0	38	38
Non-employee	0	0	303	303
Garment Showrooms				
Employee	50	0	0	50
Non-employee	0	0	24	71
Residential				
Employee	7	1	1	7
Non-employee	0	1176	1176	0
Total				
Employee	140	1	39	95
Non-employee	0	1176	1503	374
	140	1177	1542	469

For distribution of public transportation trips to the various facilities the corresponding proportions were estimated:

Public Transportation Facility	Percentage of Person Trips
Red Line - Northbound Direction* Ashmont and Braintree Branch	60
Red Line - Ashmont Branch* Southbound	15
Red Line - Braintree Branch* Southbound	15
Crosstown/Dorchester Buses	10
Total	100%

*plus shuttle bus service

TRUCK & TAXI TRAFFIC

Trucks and taxis are not explicitly addressed in this report, but are included in the counts and projections presented. The proportion of either vehicle in the total stream would be very low. Trucks would, of course, make higher demands on roadway capacity than cars, but the truck content on the adjacent Metropolitan District roadways is composed of local access trucks only (about 15 per day in 1980), as through-trucks are prohibited. The actual percentage of trucks would be well under 5%. Taxis are the same as private cars relative to capacity (or less of an impediment, judging from some taxi drivers).

There are about 50 trucks in and out during the set-up and breakdown period of a typical show at the Bayside Mall. These trucks utilize 8 loading docks that are located on the northerly side of the building. Since set-up and breakdown occur before and after a show, there is ample off-street truck storage/staging area on the parking lot.

PARKING DEMAND

The projection of future auto traffic generated by the development allows an approximate estimate of associated parking demand. For Phase I, 240 vehicular arrivals are predicted for employees while 2490 are estimated for non-employees. Allowing one space for every employee for 240 spaces and assuming ½ the non-employees can be present at peak accumulation, for 1245 spaces, Phase I would require 1485, say 1500 spaces.

For Phase II, the residential component of 1600 units, it is envisioned that one space per unit would, at the minimum, be provided, yielding 1600 spaces.

TRAFFIC VOLUMES ON THE ROADWAY NETWORK

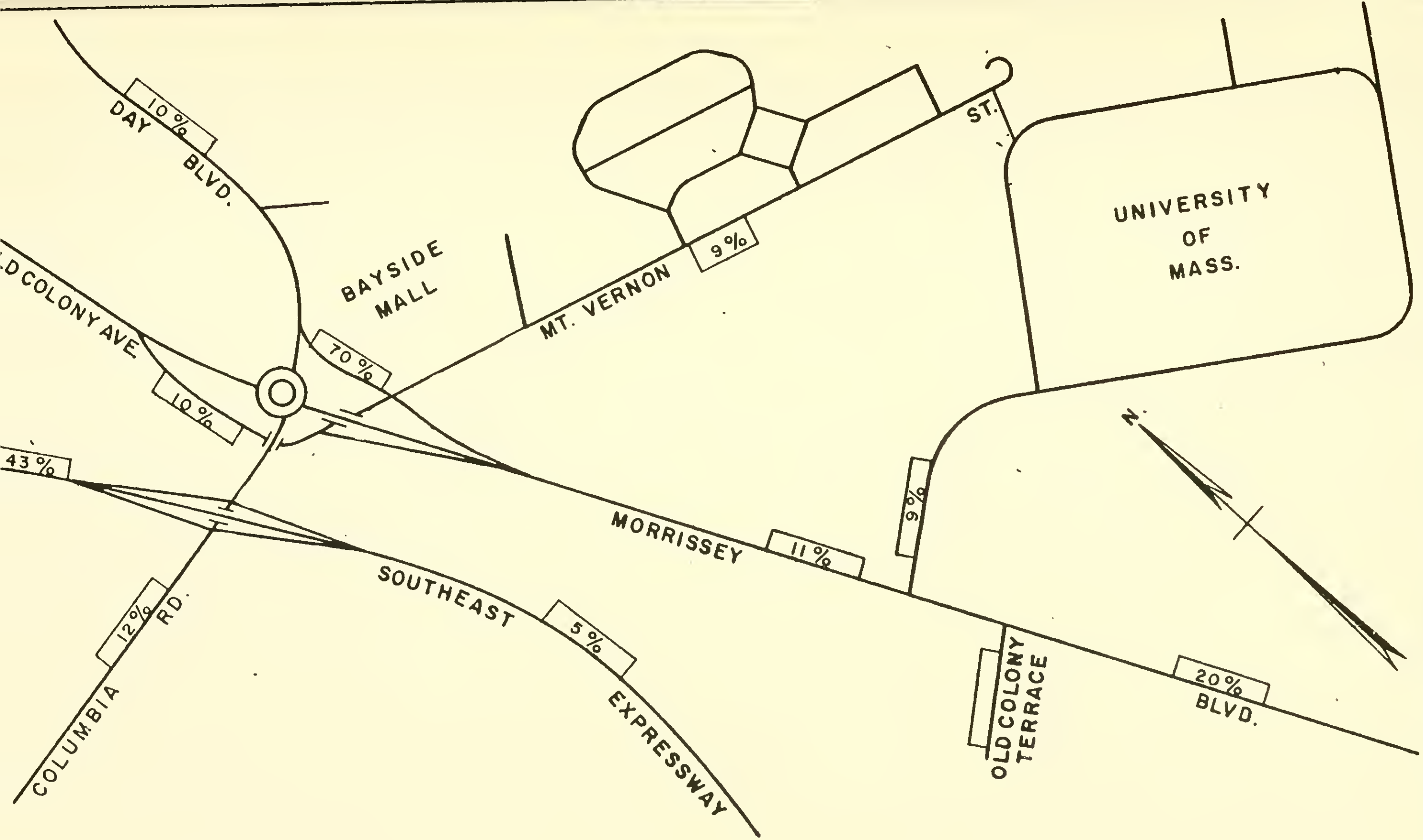
Future traffic volumes on actual roadways serving the Columbia Point area have been estimated by adding site-generated traffic for Phases I and II development, as determined above, to general traffic. General traffic was estimated by increasing 1980 existing volumes by a uniform growth factor of 0.5% per year to 1985.

The results of this traffic assignment process are shown in a number of exhibits. First, Figure 11 shows the percentages of site-generated traffic that are assigned to each roadway link. Actual volumes to and from the site are shown for an average weekday in Figures 12 to 18.

Total volumes on each link, including both site-generated and general traffic are also shown for an average weekday in Figure 20. In addition, Figure 19 shows the average weekday traffic for the no-build condition, that is, general traffic without any contribution from new development.

Table X sets forth total future traffic at key locations for an average weekday, peak 8-hour period and three hourly intervals (7:30-8:30 AM, 3:30-4:30 PM and 5:00-6:00 PM).

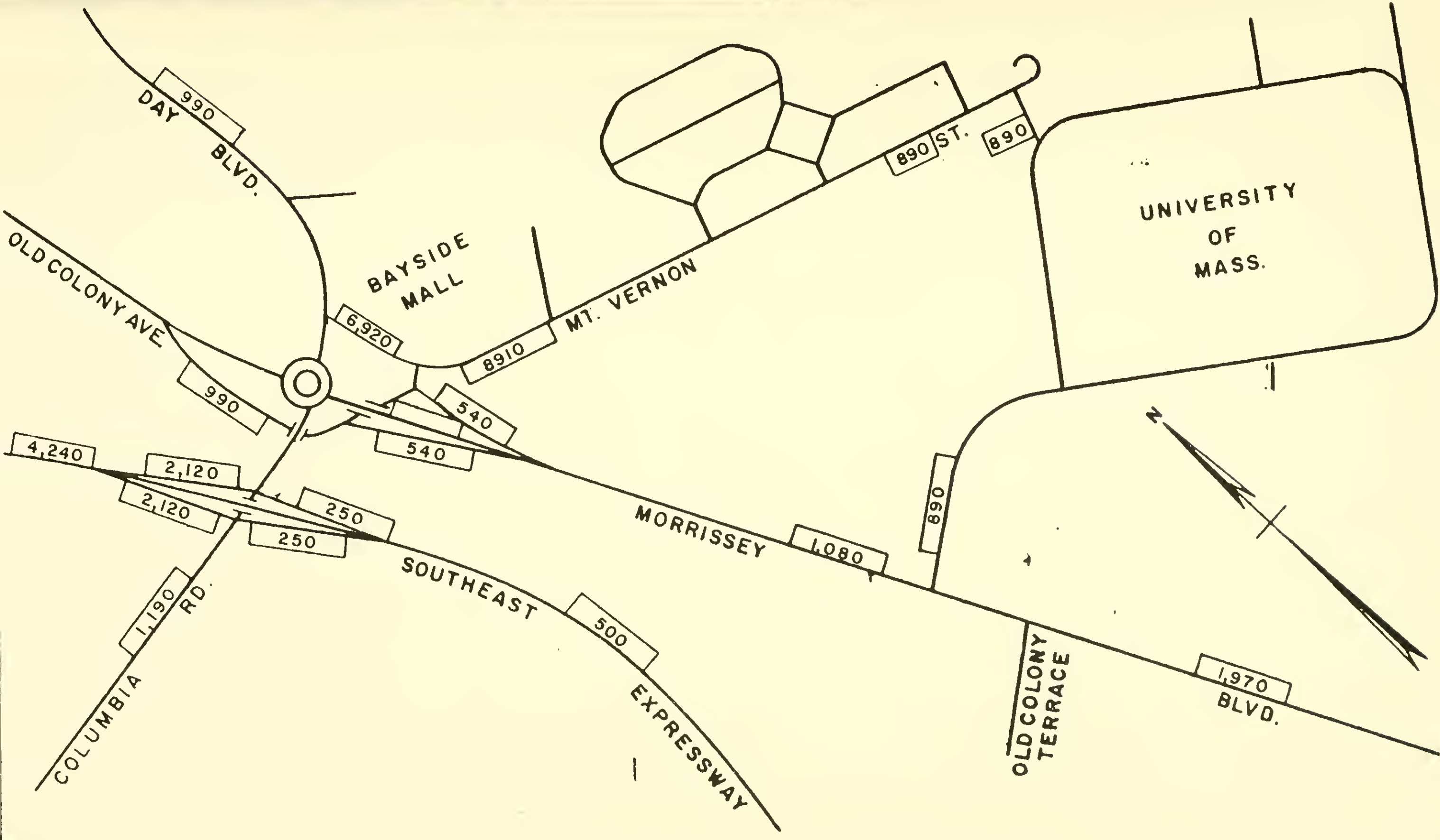
In order to give an indication of the relative contribution of the development to total traffic, Figure 21 shows a comparison of development-generated traffic with total traffic crossing a cordon line drawn around the development area, excluding the Southeast Expressway and certain legs of Kosciuszko Circle. The increase in traffic created by the development can be seen to be 8.2%.



COLUMBIA POINT PENINSULA
REVITALIZATION PROGRAM

PERCENTAGE
TRAFFIC ASSIGNMENTS
Site Generated

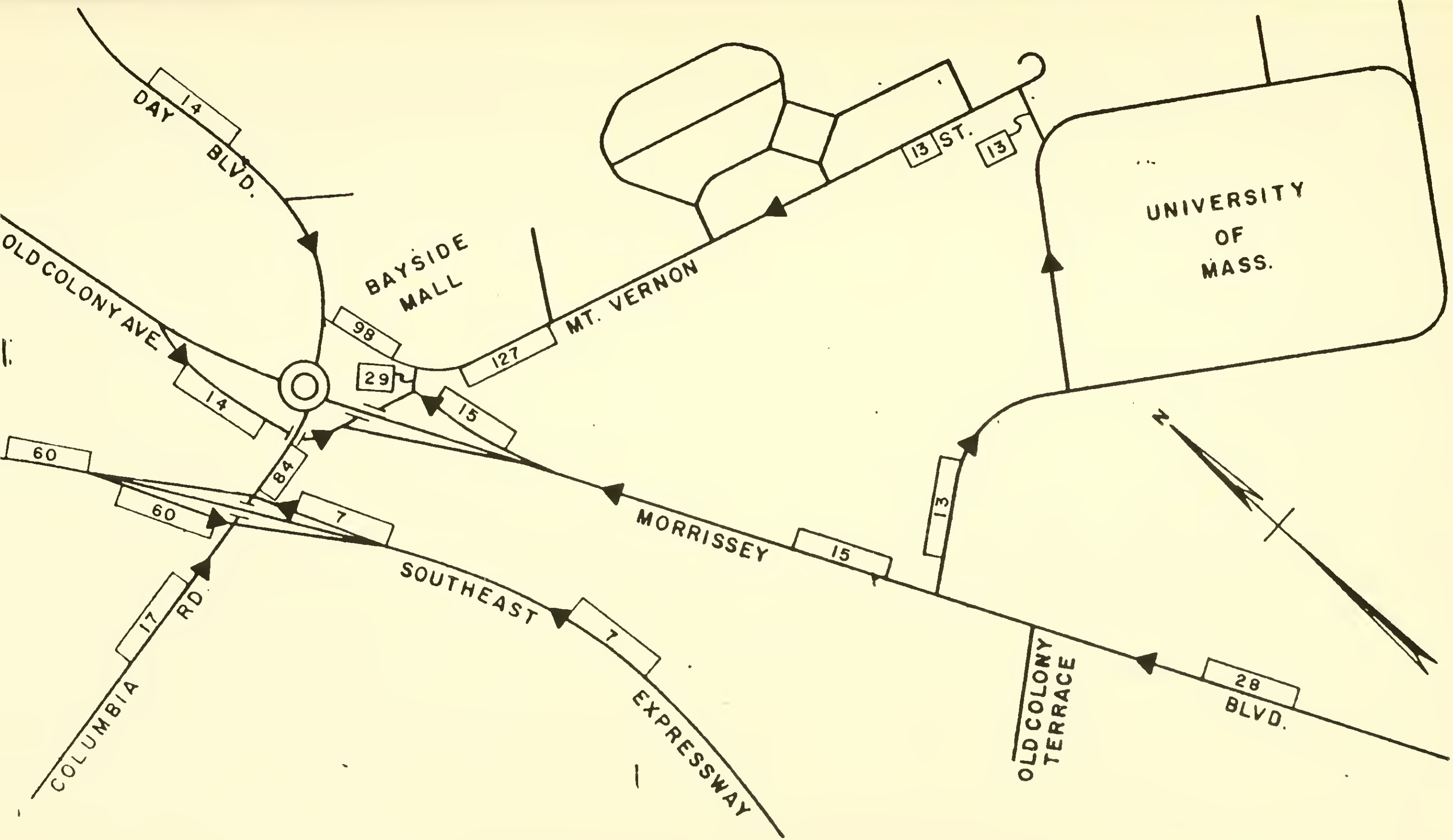
Figure: 11



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
Average Weekday Traffic
Site Generated PHASE I & II 1985

Figure: 12

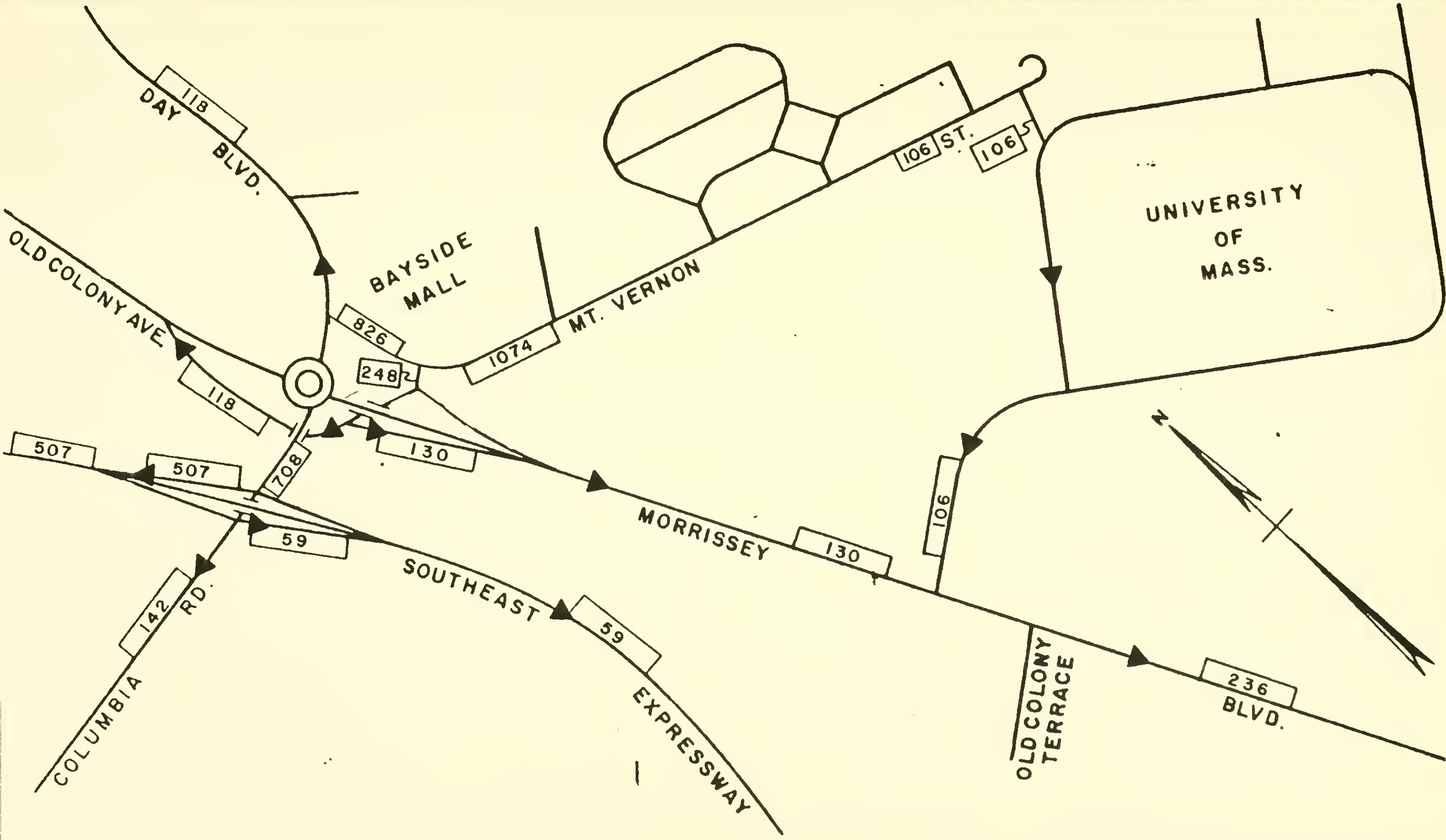


7:30 - 8:30

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
AM PEAK HOUR PHASE I & II
TO COLUMBIA POINT

Figure: 13

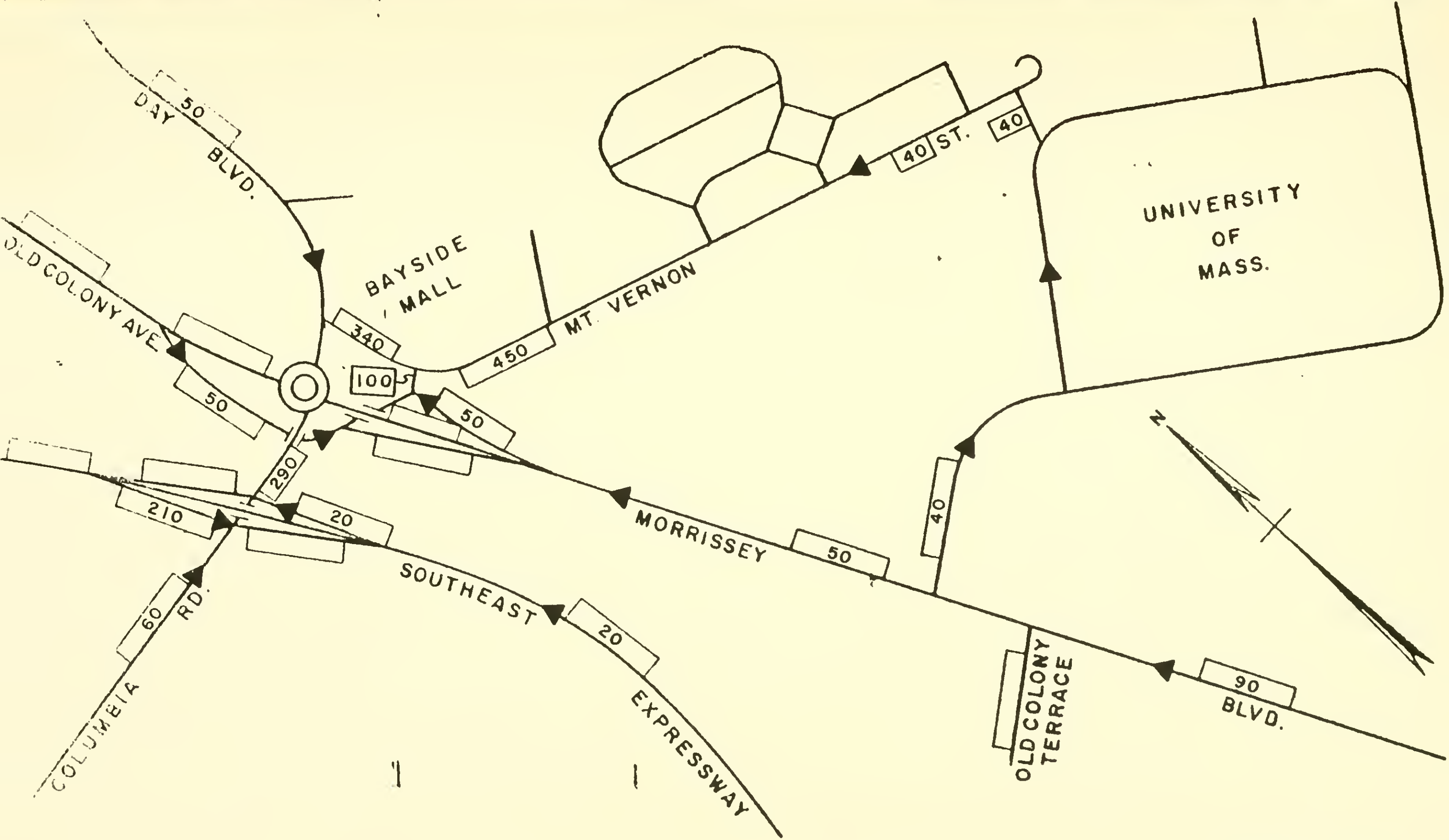


7:30 - 8:30

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
AM PEAK HOUR PHASE I & II
FROM COLUMBIA POINT

Figure: 14

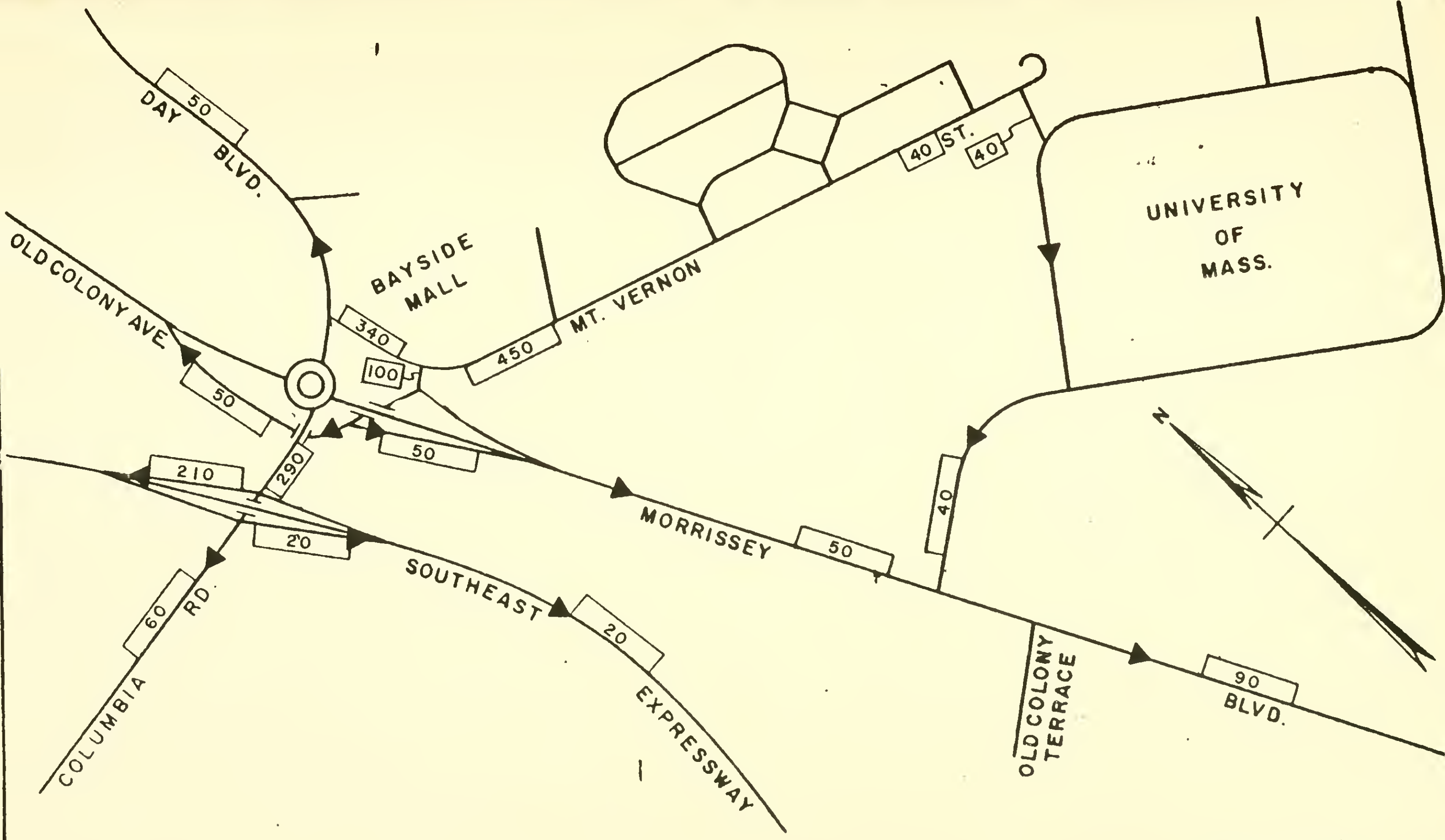


3:30-4:30

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
OFF-PEAK HOUR PHASE I & II
TO COLUMBIA POINT

Figure: 15

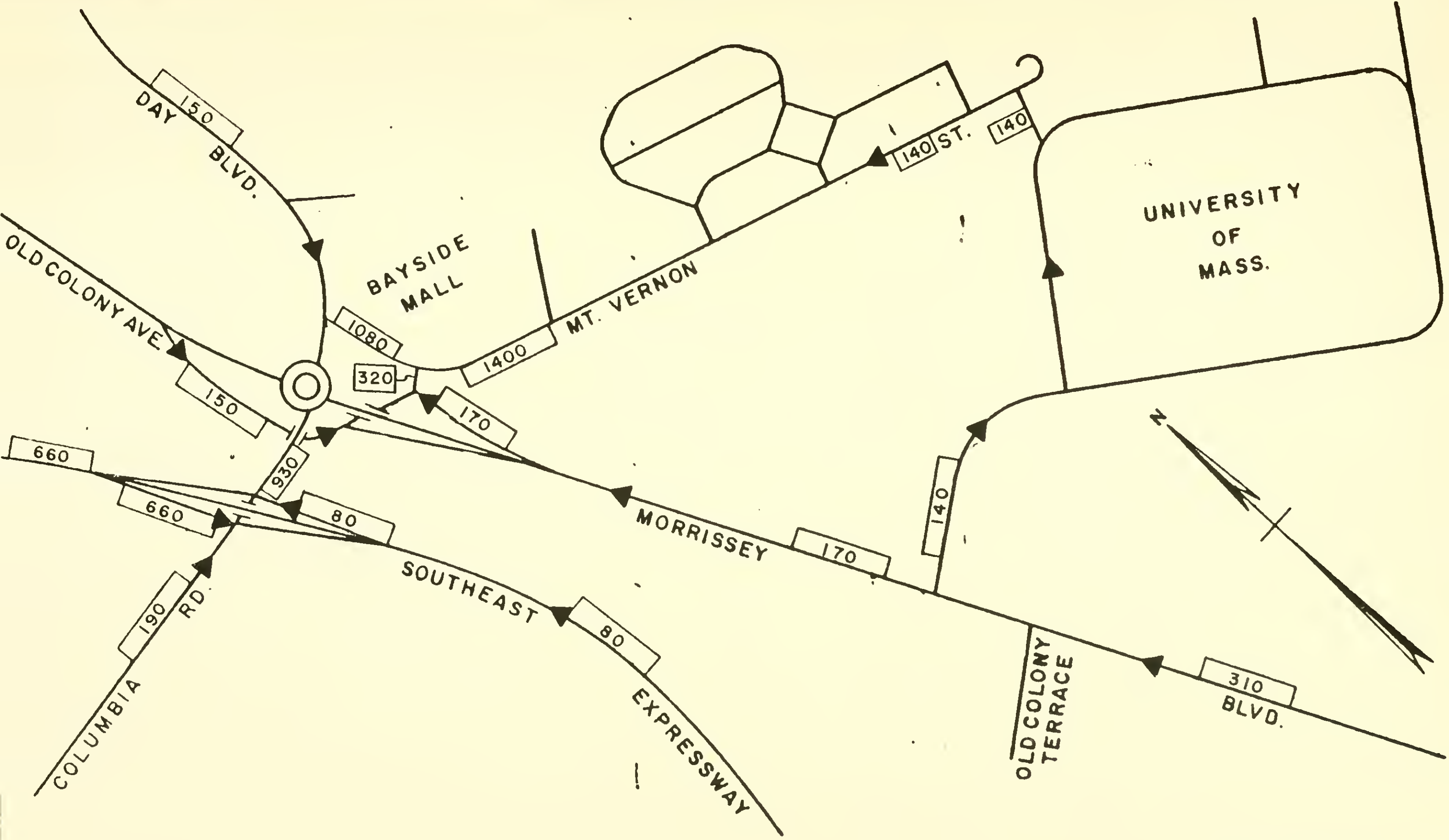


3:30 - 4:30

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
OFF-PEAK HOUR PHASE I & II
FROM COLUMBIA POINT

Figure: 16

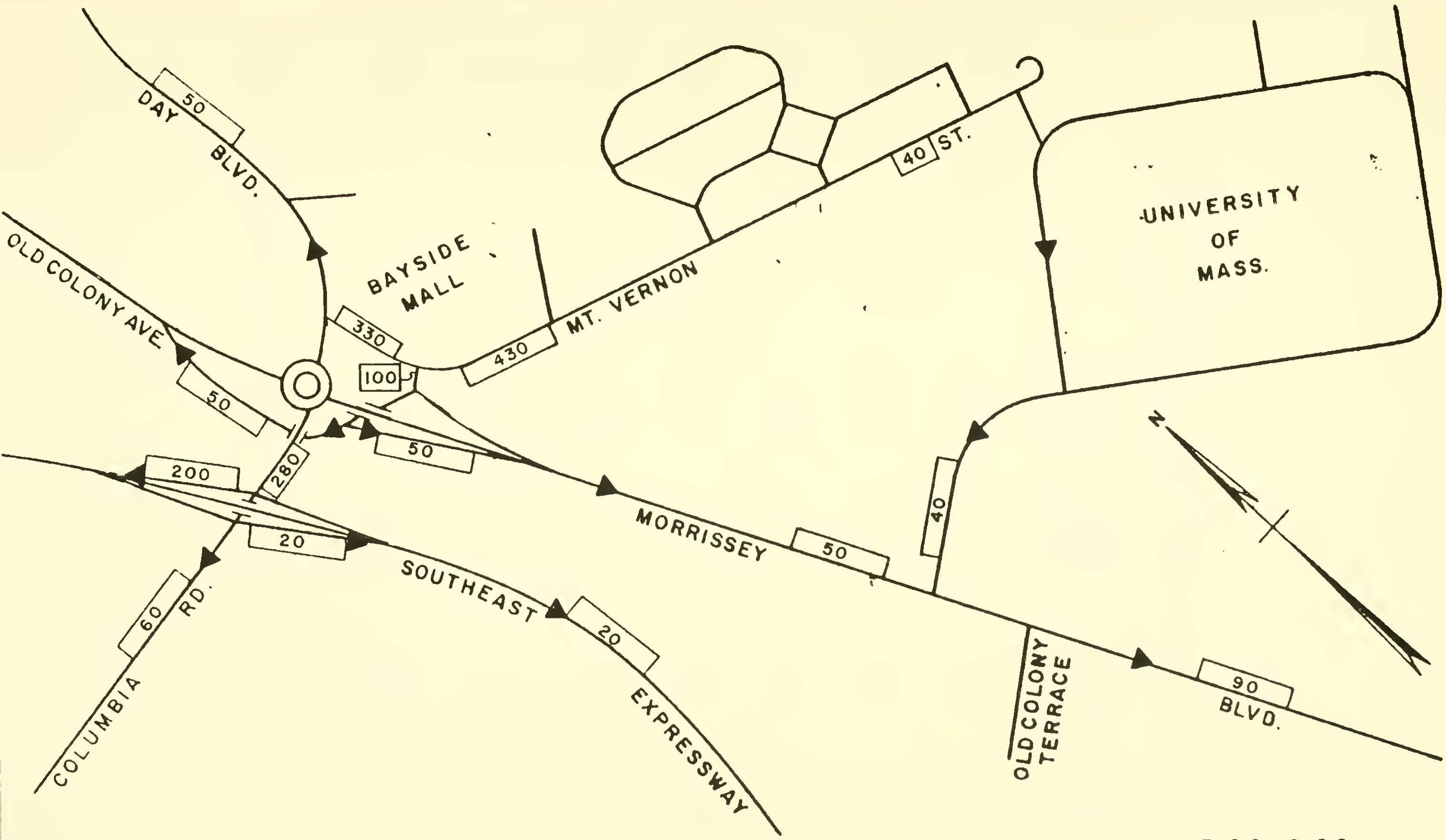


5:00-6:00

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
PM PEAK HOUR PHASE I & II
TO COLUMBIA POINT

Figure: 17



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC ASSIGNMENTS
PM PEAK HOUR PHASE I & II
FROM COLUMBIA POINT

Figure: 18

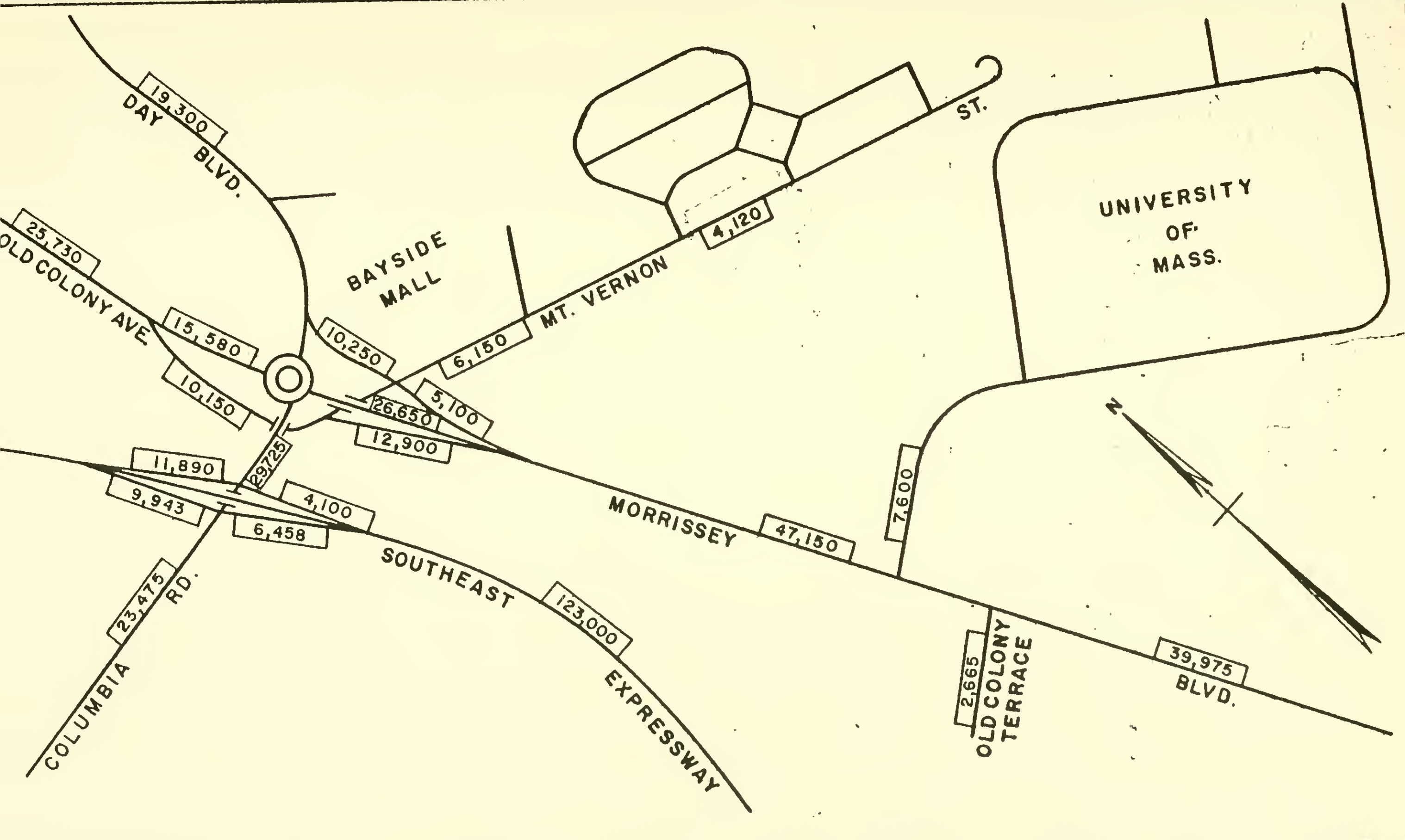
Table XI

Columbia Point Revitalization Program

Estimated 1985 Traffic Volumes on Major Project Area Streets and Highway Network with Development Phases I and II

Street	AM Peak 7:30-8:30 AM	Off-Peak 3:30-4:30 PM	PM Peak 5 - 6 PM	8-Hour 10 AM-6 PM	AWDT
Southeast Expressway					
Southbound ramp	830	820	1,090	6,190	12,060
Northbound ramp	520	280	320	2,300	4,350
Columbia Road					
Eastbound	1,180	870	1,120	7,060	14,540
Westbound	1,660	1,840	1,440	7,350	17,230
Wm. J. Day Boulevard					
Eastbound	820	790	1,330	8,990	11,790
Westbound	640	1,190	1,250	8,160	12,240
Wm. J. Day Boulevard Connector					
Northbound	1,370	880	670	3,593	11,710
Southbound	630	910	1,643	3,840	5,830
Morrissey Blvd. Off-ramp Mt. Vernon Street Connector					
Eastbound	560	380	490	1,320	4,290
Westbound	590	710	460	4,410	6,720
Old Colony Avenue Mt. Vernon St. Connector					
Eastbound	80	90	160	3,250	6,920
Westbound	860	890	550	860	9,590
Morrissey Boulevard					
Northbound	4,030	1,110	1,140	13,448	24,165
Southbound	1,450	2,490	2,610	10,990	28,960

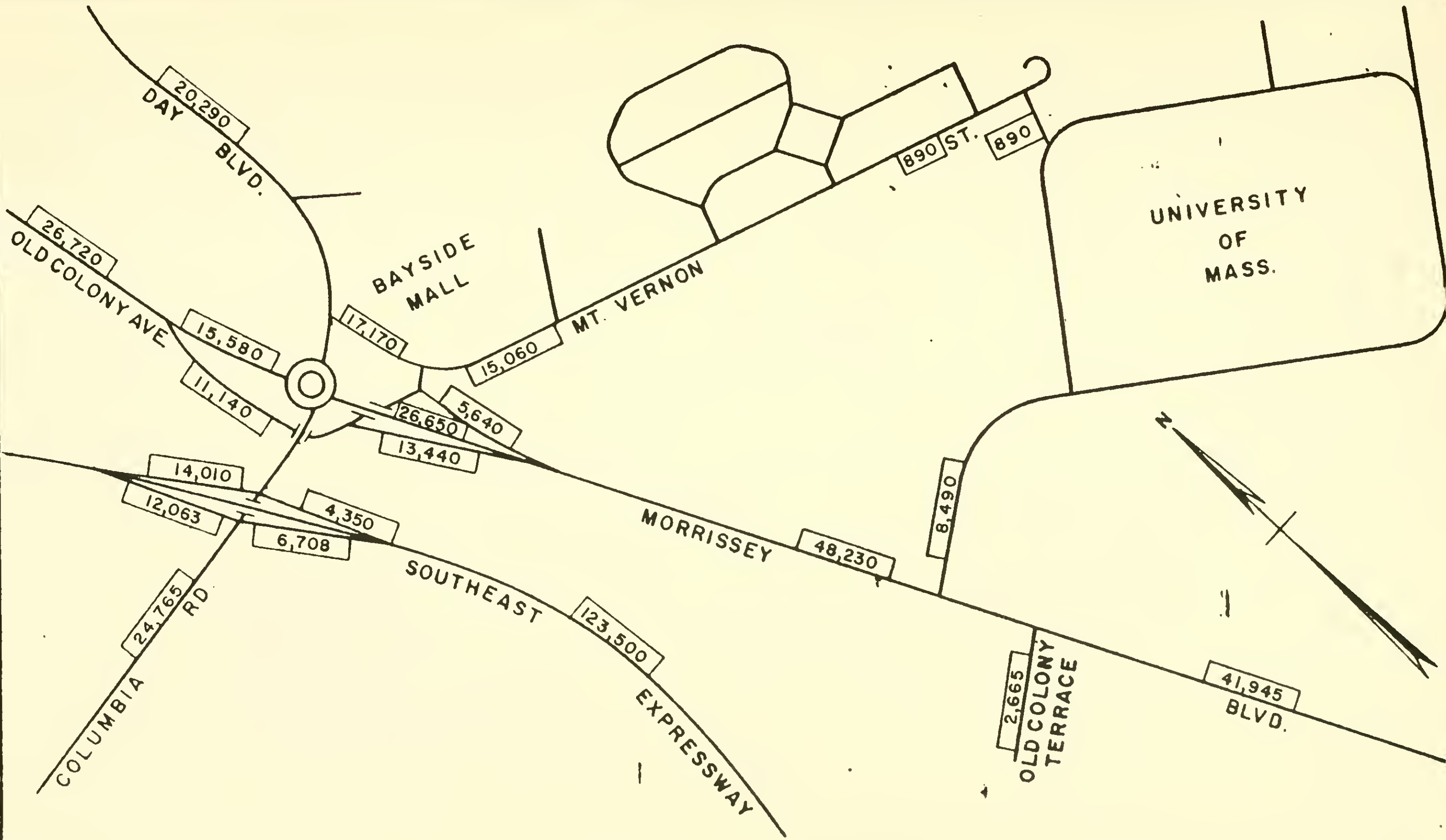
Source: BRA Transportation Planning Department



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

AVERAGE WEEKDAY TRAFFIC
NO-BUILD 1985

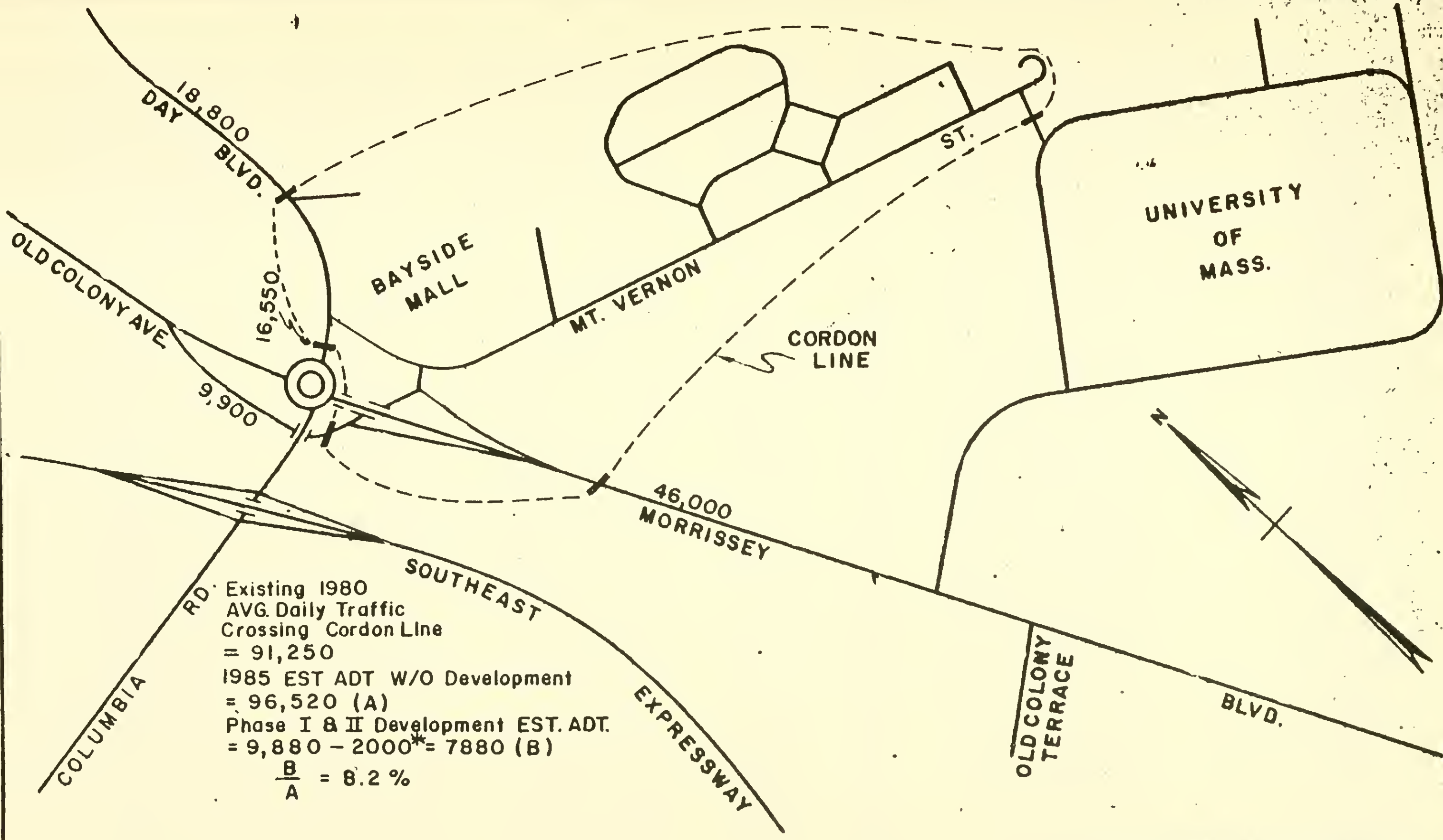
Figure: 19



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

AVERAGE WEEKDAY TRAFFIC
PHASE I&II 1985

Figure: 20



Existing 1980
AVG. Daily Traffic
Crossing Cordon Line
= 91,250
1985 EST ADT W/O Development
= 96,520 (A)
Phase I & II Development EST. ADT.
= 9,880 – 2000* = 7880 (B)
$\frac{B}{A}$ = 8.2 %

*, School Bus Operation Removal

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

TRAFFIC VOLUME OVERVIEW
PHASE I & II DEVELOPMENT

Figure: 21

V. ASSESSMENT OF TRANSPORTATION IMPACTS & MEASURES TO MINIMIZE NEGATIVE EFFECTS

Roadway Network Congestion

As in many urban developments, one of the chief concerns is how the generation of additional automotive traffic will impact the project area by the creation of additional congestion, delays, waste of energy and air pollution. In this present case, projected future traffic has been calculated and assigned to roadway facilities, as described in Chapter IV. This future traffic has been analyzed with respect to roadway capacity to indicate Levels of Service at key intersections for morning, evening and off-peak hours, for both no-build and build conditions. These "LOS" are shown in Figure 22 and are also compared in summary form at selected locations in Table XII.

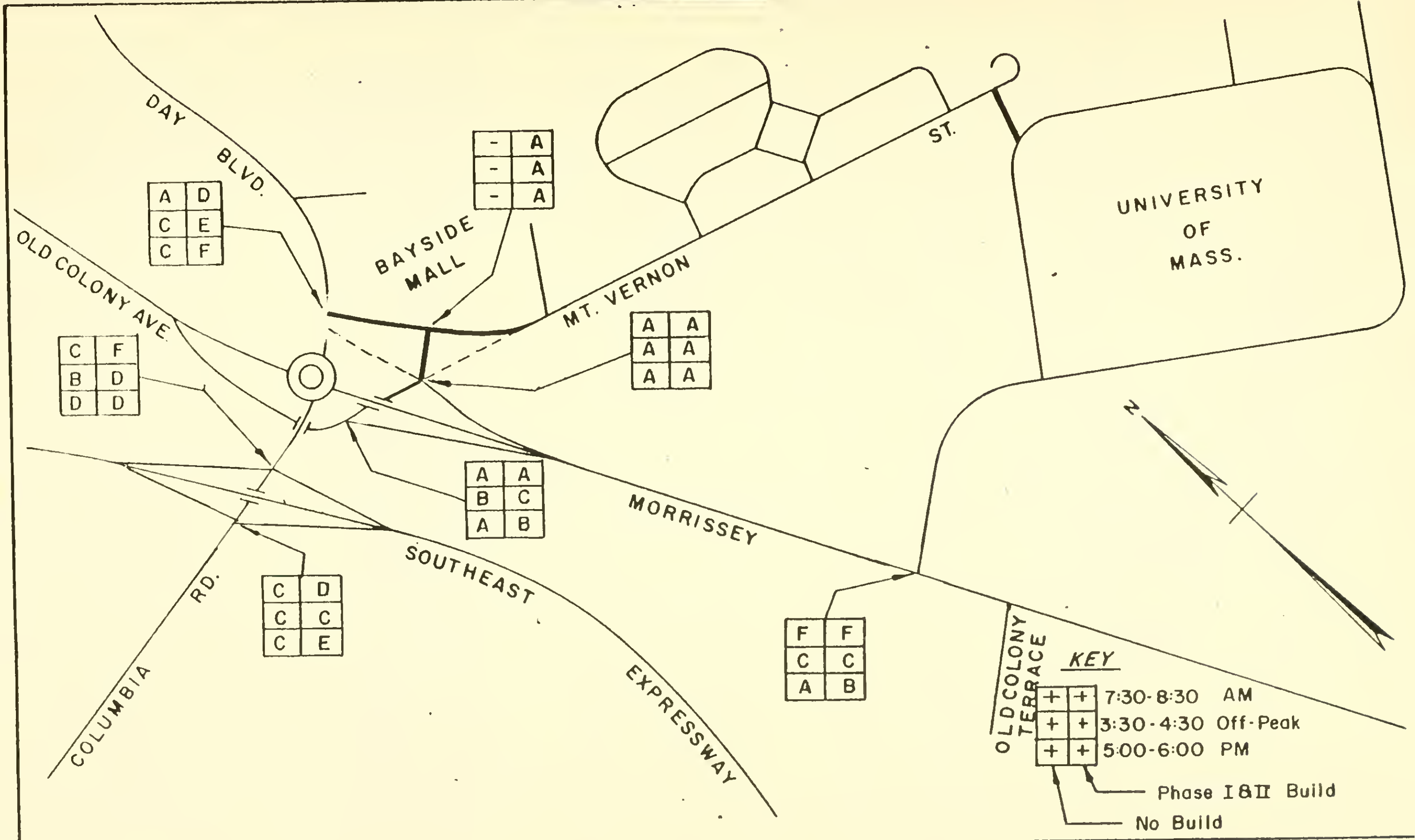
The future capacity calculations, it should be noted, are done assuming both the Columbia Road bridge and the bridge over Mt. Vernon Street have been replaced. This should be the case when Phase I and II developments are complete.

Attention should also be brought to the fact that the no-build LOS are identical to the existing 1980 LOS shown in Chapter II as the 0.5% growth per year to 1985 without any new developmental traffic is not great enough to cause an LOS change. The comparisons made therefore apply to existing base conditions as well as no-build.

As development traffic disperses in several directions into the overall traffic system fairly quickly, the only complete breakdown in traffic service occurs close to the development at the intersection of Day Boulevard and the new Mt. Vernon Street connector and the intersection of Columbia Road and the northbound expressway on-ramp. In the first instance, an LOS of F is created in the PM peak hour, while at the second intersection an LOS of F occurs in the AM peak hour. Means of overcoming these conditions or mitigating conditions will be discussed later. At the other hours analyzed, these two critical intersections operate at an LOS of E or better.

At all other intersections and analysis hours, with one exception, "build" condition LOS's are D or above, pointing to satisfactory operations. The exception is the intersection of Morrissey Boulevard and U-Mass Roadway where the LOS is F in the AM peak hour in both the "no-build" and "build" conditions. The build condition only adds 40± vehicles per hour to the governing northbound no-build volume of 4,000, showing that the development adds only a small increment to the poor operations at the intersection. The other two hours assessed have acceptable LOS's.

In perspective, it may be stated that the severely negative impacts of the development, congestion-wise, are localized at two intersections on either side of Kosciuszkc Circle during specific hours of an average day. At the location most impacted by development traffic, Day Boulevard and the new Mt. Vernon Connector, where an LOS of F is predicted in the PM peak, the results of traffic analyses were used as input to air quality which are described in another report. It can be briefly noted, however, that despite the low LOS, no violation of Carbon Monoxide Standards are predicted.



COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

PEAK HOUR LEVEL OF SERVICE

Figure: 22

Table XII

Columbia Point Revitalization Program

Estimated Levels of Service - 1985

Intersection	No-Build without Development 7:30 8:30	3:30 4:30	5:00 6:00	Phases I and II 7:30 8:30	3:30 4:30	5:00 6:00
Columbia Road Expressway NB Off-ramp	C	B	D	F	D	D
Columbia Road Expressway SB Off-ramp	C	C	C	D	C	E
Wm. J. Day Boulevard Wm. J. Day Blvd. Connector	A	C	C	D	E	F
Old Colony Ave.- Morrissey Blvd. SB On-ramp	A	B	A	A	C	B
Mt. Vernon St.-Wm. J. Day Blvd. Connector (Existing)	A	A	A	-	-	-
New Wm. J. Day Blvd.- Mt. Vernon St. Connector/ Morrissey Blvd./Old Colony Ave. Connector	-	-	-	A	A	A
U-Mass.-Morrissey Blvd.	F	C	A	F	C	B

---

*Levels of Service are based on volume-capacity ratios according to the Highway Capacity Manual (Highway Research Board, 1965). Levels range from A to F, with A representing free-flow traffic and excellent service conditions and F representing forced-flow, stop-and-go traffic and jammed conditions. Urban traffic conditions are considered acceptable if they are at LOS C or better.

Effects of other Transportation Elements - Transit, Boats, Parking

The impacts of actions in other transportation components can generally be regarded as positive and as mitigating to areas of congestion on the roadway network.

Specific public transportation improvements on the Red Line at Columbia Station, and more generally as in the opening of the South Quincy Station and Alewife extension, will help to attract more riders away from automobiles. It is not expected that any increased transit ridership will overtax the carrying capacity of an efficiently-operated Red Line. In this regard, there are long-range plans to permit the operation of six-car trains on the Red Line. For direct connection to all future Columbia Point activities, a revised and improved shuttle bus service will be necessary. The MBTA will also evaluate the need for any revision of bus sched and routings to maintain proper access from areas not served by rapid transit.

In like manner, the institution of boat service to Columbia Point can only help reduce the reliance of residents, patrons, visitors, students and employees on car access. In this case, the type of boat and frequency of service should match the demand generated.

Parking, as it is now assessed, will match the demands of the new development. The Exposition Center is "adopting" the parking of the former Bayside Mall and will consider the building of an additional parking garage if needs dictate. Housing plans envision parking sufficient for residence needs. It is important that parking be monitored as a short-fall in parking, or poor management of it can lead to wanton on-street parking where traffic could be impeded or where adjacent neighborhoods could be adversely affected.

Congestion Mitigation Measures

The most obvious inconsistency in the operations of the future roadway network is that an LOS of F occurs (in the 5:00-6:00 PM peak hour) at the key intersection of the proposed roadway improvements at Day Boulevard and the new Mt. Vernon Street Connector. This is caused by two factors -- the assumed geometric layout of the intersection and the nature of the traffic served.

If an additional approach lane is provided on both Day Boulevard approaches, the LOS is raised to an acceptable level of D. This measure will be incorporated into the engineering of the concept and should not drastically raise the expected cost of construction.

In tailor-making the design to yield good operations at the intersection in question, it should be noted that a major contributor to the volume being served is an existing traffic flow which is routing from Morrissey Boulevard and by-passing Kosciuzsko Circle to use Day Boulevard to go to South Boston, or, to a considerable extent, through South Boston to the Downtown area. This movement has been carried into the future traffic projections and mixes with new development traffic to cause capacity problems. It would be most desirable if this flow would stay on expressway or major arterial roadways, but it is not possible to arbitrarily reassign it elsewhere.

The new layout of the roadway improvements is such as to make the by-pass movement more awkward and some reduction might therefore result. Also, the overall improvements to the Red Line and any betterment to the Southeast Expressway would contribute to a lessening of auto usage and a shift away from the use of more local by-pass routings.

Another major contributor to the AM and PM peak-hour load at Day Boulevard/New Mt. Vernon Street Connector is the substantial flow from and to the new housing. Although no changes are being recommended at this time in the estimation of this flow, it is felt that the estimate concentrates a rather high proportion of vehicular trips into each peak hour and might be considered high. This is partially off-set, it may be seen, by a 50% modal split to other modes than auto.

The AM peak hour LOS of F at Columbia Road and the northbound on-ramp to the expressway is also influenced by the rather peaked residential generation of vehicles noted in the last paragraph and thus might operate somewhat better in practice.

The operating conditions at U-Mass. Roadway and Morrissey Boulevard are very sensitive to Southeast Expressway conditions. If conditions are bad, additional traffic will detour to Morrissey Boulevard, if good, more traffic will remain on the Expressway.

As noted in the preceding section, the greater the improvements to public transportation, shuttle bus and boat service, the more auto congestion at susceptible locations can be avoided. The encouragement overall of staggered work hours will positively affect the peak period Level of Service for all modes. The prudent scheduling of events and promotion of transit at the Bayside Exposition Center and at U-Mass. are local actions which can also help avoid congestion. Carpooling for those who insist in using automobiles will reduce the number of vehicles being used but it represents a measure which has not met with great success in the past. All these measures should be vigorously pursued to offset vehicular congestion at the indicated locations and times.

It would appear in summary that the proposed roadway improvements, carefully designed along with a series of other transportation initiatives as mitigating measures, will likely accommmodate the new development and other future traffic at acceptable levels of service if mitigating measures aimed at greater use of public transportation and less peaking of automotive travel are pursued. It is encouraging to see that the intersection of Day Boulevard and the new Mt. Vernon Street connector when analyzed at an LOS of F before recommended design changes did not cause violation of CO air quality standards. By analogy, it seems likely and fortuitous that other locations do not pose violations of this standard.

Property of
BOSTON REDEVELOPMENT AUTHORITY
Library

Property of
BOSTON REDEVELOPMENT AUTHORITY
Library

Property of
[illegible] REDEVELOPMENT AUTHORITY

Property Of
BOSTON REDEVELOPMENT AUTHORITY
Library

Property Of
BOSTON REDEVELOPMENT AUTHORITY
Library

BOSTON PUBLIC LIBRARY
3 9999 06352 192 4